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UNITED STATES DEPARTMENT OF AGRICULTURE  
BUREAU OF PLANT INDUSTRY  
B. T. GALLOWAY, Chief of Bureau

R E F E R E N C E B O O K  
of the Work of the  
BUREAU OF PLANT INDUSTRY  
For the Fiscal Year

1909

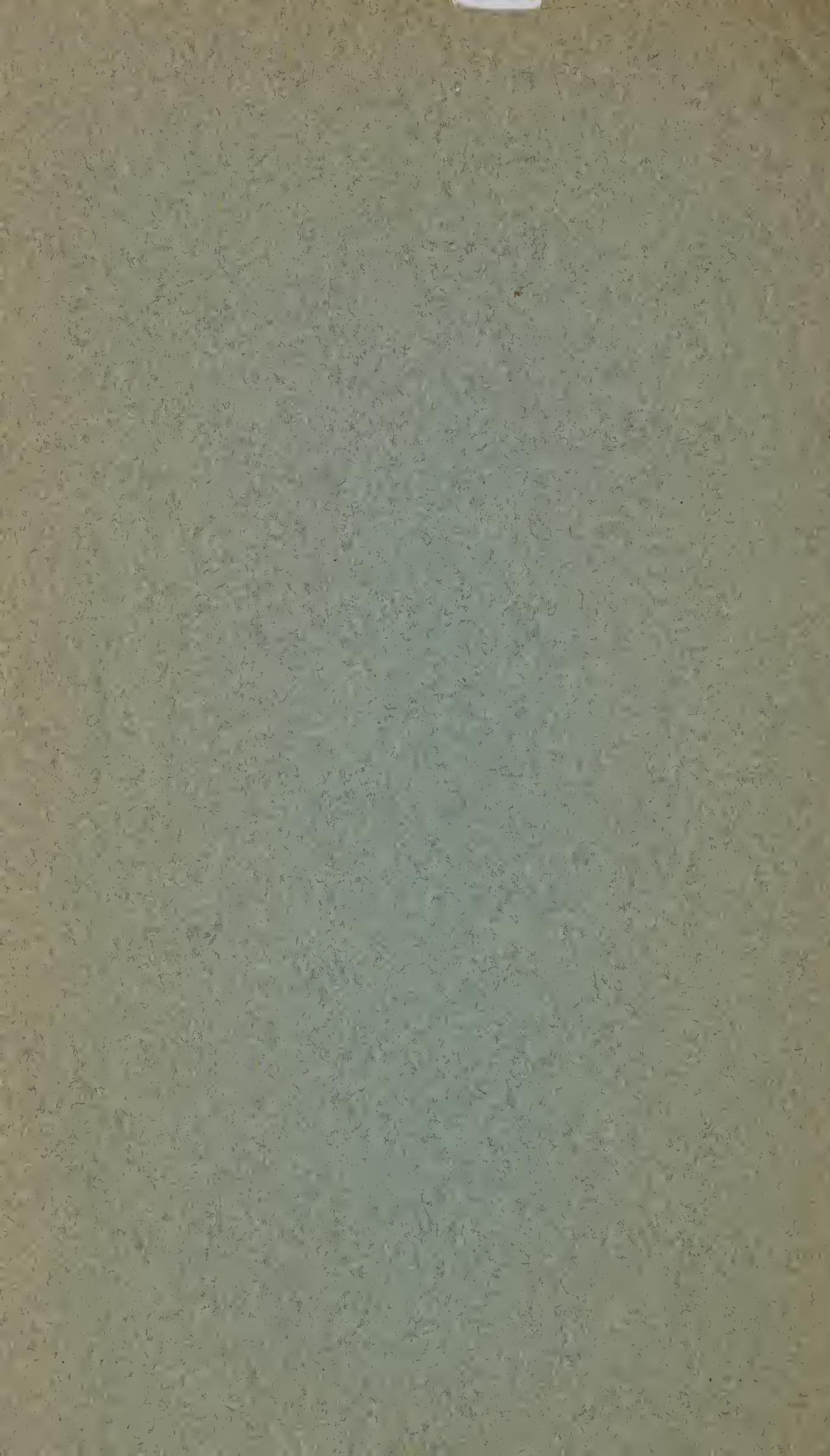
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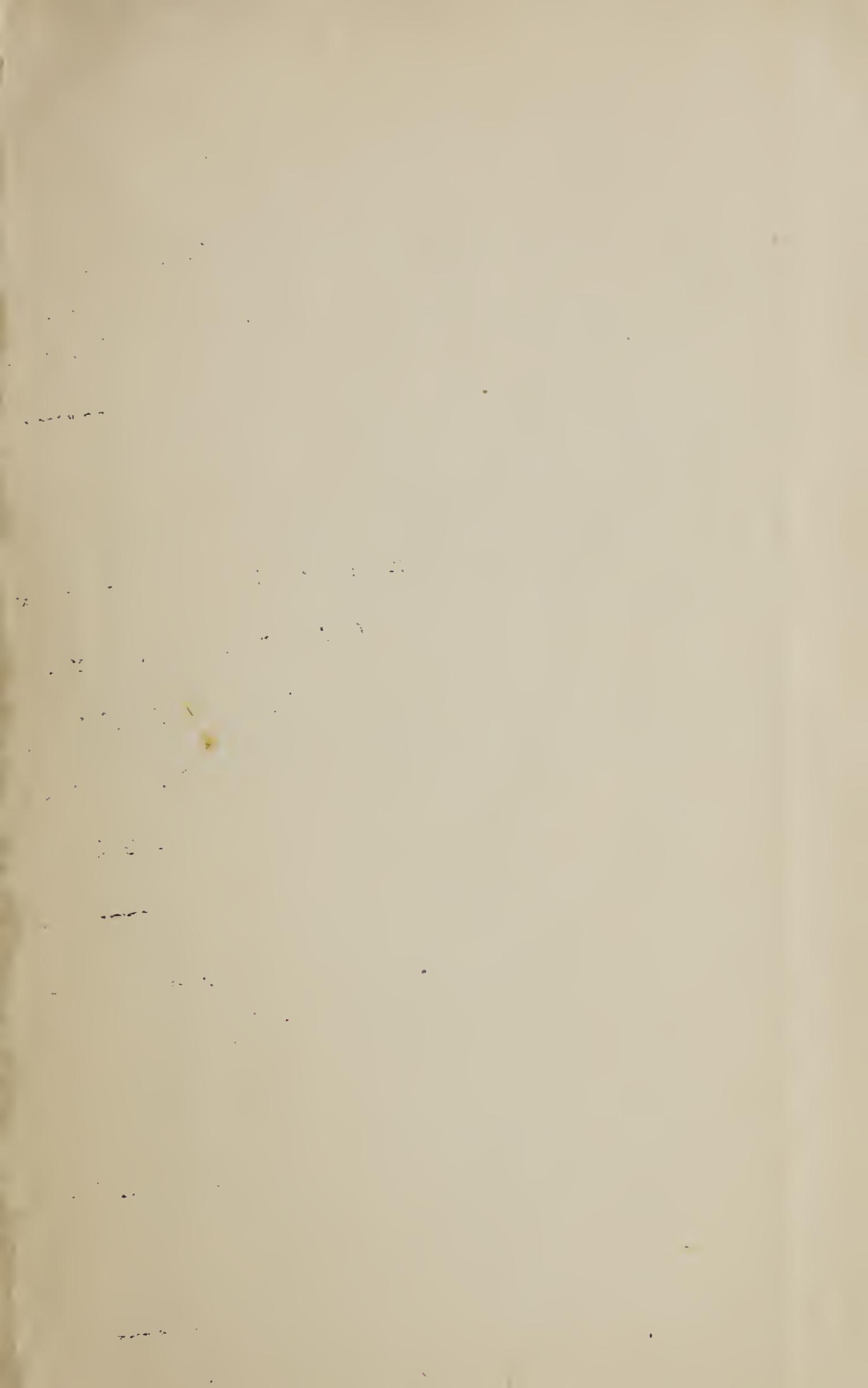
By

WILLIAM L. MARCY

WASHINGTON

1909

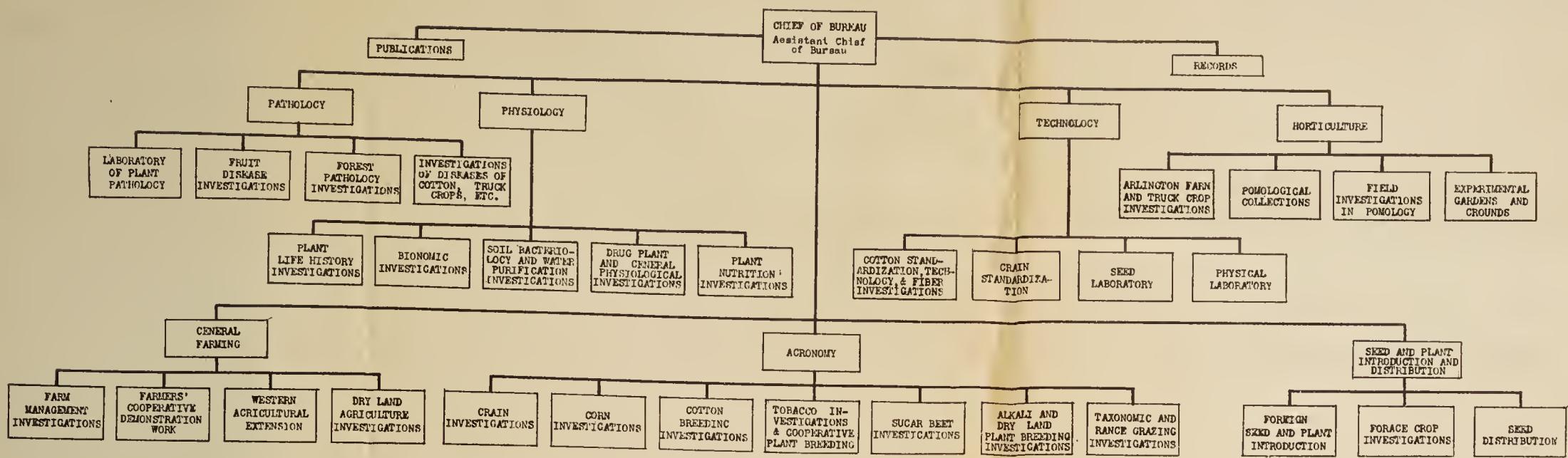








THE BUREAU OF PLANT INDUSTRY



OFFICERS AND SCIENTIFIC STAFF

CHIEF OF BUREAU  
BEVERLY T. GALLOWAY, Physiologist and Pathologist

LABORATORY OF PLANT PATHOLOGY  ERWIN F. SMITH Pathologist in Charge	Identification of diseased specimens; study of bacterial diseases of plants, methods of prevention, etc. Pathological collections; inspection of greenhouses, plants imported, etc.	Dr. Smith, assisted by John R. Johnston, Florence Hedges, James F. Brewer, and Lucia McCulloch Flora W. Patterson, Mycologist, assisted by Vera K. Charles
INVESTIGATIONS OF DISEASES OF FRUITS  MERTON B. WAITE Pathologist in Charge	Investigations of orchard diseases; eradication of pear blight, peach diseases, etc. Investigations of diseases of the grapes, orange, berry, and other small fruits Spraying experiments and demonstrations in the control of orchard diseases	Mr. Waite, assisted by P. J. O'Gara, W. S. Ballard, F. V. Rand, and Clara H. Hasse C. L. Shear, Pathologist, assisted by G. F. Miles, L. A. Hawkin, and Anna K. Wood W. M. Scott, Pathologist, assisted by J. B. Rorer and T. W. Ayres
INVESTIGATIONS IN FOREST PATHOLOGY  HAVEN METCALF Pathologist in Charge	Investigations of diseases of forest trees and woods, ornamental and shade trees, and shrubs; diseases caused by mistletoe, etc. Investigations of white pine blight, damping-off disease of tree seedlings, etc.	Dr. Metcalf and George G. Hadgood, Pathologist, assisted by Carl P. Hartley Perley Spaulding, Pathologist
INVESTIGATIONS OF DISEASES OF COTTON, TRUCK CROPS, ETC.  WM. A. ORTON Pathologist in Charge	Investigations of diseases of cotton, cowpeas, truck crops, etc.; breeding of disease resistant varieties; spraying demonstrations, etc. Plant disease survey—collection of data regarding occurrence and spread of plant diseases	Mr. Orton, assisted by W. W. Gilbert and L. L. Hartser Mr. Orton, assisted by Adeline Ames
PLANT LIFE HISTORY INVESTIGATIONS  WALTER T. SWINGLE Physiologist in Charge	Establishment of date cultures; life history investigations of fruits and nuts; cooperative demonstrations on Indian reservations; etc. Alfalfa and clover life history investigations Investigations of dry land tree crops—olives, almonds, peaches, etc.	Mr. Swingle, assisted by W. L. Flanery, E. M. Savage, E. W. Hudson, and Bruce Drummond Charles J. Brand, Physiologist Silas C. Mason, Arboriculturist
BIONOMIC INVESTIGATIONS  O. F. COOK Bionomist in Charge	Acclimatization and adaptation of weevil resistant cottons, corn for special conditions, etc.; study of tropical crops—rubber, cacao, etc.	Mr. Cook, assisted by H. Pittier, C. N. Colline, F. L. Lewton, Argyle McLaughlin, J. H. Kinsler, and C. B. Doyle
SOIL BACTERIOLOGY AND WATER PURIFICATION INVESTIGATIONS  KARL F. KELLERMAN Physiologist in Charge	Investigations in soil bacteriology, especially with reference to plant nutrition; investigations and distribution of nodule-forming bacteria for inoculation of legumes; study and demonstration of farm water purification, etc.	Mr. Kellerman, assisted by T. R. Robinson, E. R. Allen, Ira G. McBath, F. L. Goll, and Edna H. Fawcett
DRUG PLANT, POISONOUS PLANT, AND GENERAL PHYSIOLOGICAL INVESTIGATIONS  RODNEY H. TRUE Physiologist in Charge	Establishment and study of camphor cultures Experiments and demonstrations in drug plant cultivation Investigations of hops, tanning and dye plants Preparation of literature on native drug plants Investigations of industrial alcohol manufacture from the waste products of the farm Investigations of American lemon production Investigations of American tea production Field work on poisonous plants—loco weeds, etc. Laboratory work on drug and poisonous plants	Dr. True, assisted by S. C. Hood and Frank Rabek Dr. True, assisted by G. F. Klugh and T. B. Young W. W. Stockberger, Pharmacognosist Alice Heinkel, Assistant Dr. True  Dr. True, assisted by A. F. Sievers Dr. True, assisted by C. F. Mitchell C. Dwight Marsh, Expert Carl L. Alsborg, Expert
PLANT NUTRITION INVESTIGATIONS  Directed by the ASSISTANT CHIEF OF BUREAU	Notes.—The projects forming this branch of the Bureau, which is now being organized, are distributed among the various other lines of investigation of the Bureau, herein described.	

FARM MANAGEMENT INVESTIGATIONS  W. J. SPILLMAN Agriculturist in Charge	General supervision of all investigations Farm management investigations and demonstrations in sectional districts, viz: (1) N.C., S.C., Ga., and Fla.; (2) Ala., Miss., and Tenn.; (3) La. and Ark.; (4) Tex. and Okla.; (5) New York and New England; (6) Oreg., Wash., Idaho, and N. Cal.; (7) Iowa, Mo., Kans., Nebr., and e. Colo.; (8) Va., Md., and Del.; (9) Ill., Ind., Ohio, Ky., and W. Va.; (10) N.J. and Pa.; (11) Wis., Mich., Minn., N.Dak., and S.Dak. Farm practice investigations and demonstrations in special phases of farming, viz: (1) forage production on beef, hog, and sheep farms; (2) tillage and weed eradication; (3) hay and haymaking; (4) use of manures and fertilizers Ranges management and cactus investigations Study of farm economics—accounts, records, organization, equipment, buildings, machinery, etc. Preparation of working plans for farms	Prof. Spillman D.A. Brodie, Assistant agriculturist, in general charge, and (1) C.L. Goodrich and A. G. C. Smith; (2) M. A. Creeby; (3) A. D. McNair; (4) B. Youngblood; (5) L.G. Dodge, N.G. Burritt, and C. E. Monroe; (6) Byron Hunter; (7) J.A. Warren; (8) H.A. Miller; (9) J.A. Drake; (10) G.A. Billings; (11) J.C. McDowell
FARMERS' COOPERATIVE DEMONSTRATION WORK  SEAMAN A. KNAPP Special Agent in Charge	General direction of the work Demonstrations of improved cultural methods in boll weevil section, viz: (1) east Texas; (2) west Texas; (3) Oklahoma; (4) Louisiana and Arkansas; (5) Mississippi and Alabama Cooperative extension of demonstration work into (1) Florida, (2) Georgia, (3) South Carolina, (4) North Carolina, and (5) Virginia	C.B. Smith, Assistant agriculturist, is general charge, and (1) J. S. Cotton and D.H. Doane; (2) S. Gates and H.R. Cox; (3) H.B. McClurk; (4) J.C. Beavere David Griffiths, Assistant agriculturist W.A. Peck, Assistant agriculturist, and L.W. Ellie J.W. Froley, Assistant
DRY LAND AGRICULTURE INVESTIGATIONS E. C. CHILCOTT Agriculturist in Charge	Investigations and experiments in the semiarid West or Great Plains Area—Mont., N.Dak., S. Dak., Nebr., Kans., Colo., and Tex.; devising of crop rotations, cultural methods, etc.	Dr. Knapp, assisted by S. Arthur Knapp, J.P. Campbell, and H.E. Savely Dr. Knapp, assisted by (1) W.F. Procter, (2) J.L. Quicksell; (3) W.D. Bentley, (4) J.A. Evans; and (5) R.S. Wilson, all of whom direct a corps of agents Dr. Knapp, assisted by (1) A.S. Moharg, (2) Elbert Gentry, (3) I.W. Williams, (4) C.R. Hudson, and (5) T.O. Sandy
WESTERN AGRICULTURAL EXTENSION CARL S. SCOFIELD Agriculturist in Charge	Establishment of profitable agriculture on the U.S. Reclamation Project; testing of crops suited for growth on reclaimed lands Operation of experiment farm at San Antonio, Tex.	Prof. Chilcott, assisted by J. S. Cole, C.A. Jensen, J.M. Stephens, F. L. Kenward, J.E. Payne, W.W. Burr, E.F. Chilcott, and O.J. Grace Mr. Scofield, assisted by F.B. Headley, W.A. Peterson, and S.J. Rogers Mr. Scofield, assisted by S.H. Hastings
GRAIN INVESTIGATIONS M. A. CARLETON Cerealist in Charge	Wheat investigations; cereal breeding and introduction; crop rotation experiments, etc. Experiments with dry land cereals—adaptation, improvement, etc. Grain sorghum investigations and improvement Oat adaptation and breeding Barley introduction and improvement Rice investigations and improvement Investigations of cereal ruts, smuts, etc. Grain experiments in the Texas Panhandle	Mr. Carlton, assisted by H. F. Blanchard, H.J.C. Umberger, and V.L. Cory W.M. Jardine, Agronomist, assisted by F.D. Farrell, C. Salmon, and W.G. Shelly Carlton R. Ball, Agronomist C.W. Warburton, Agronomist, assisted by L.C. Burnett H.B. Dorr, Agronomist Charles E. Chambliss, Expert E.C. Johnson, Pathologist John F. Rose, Superintendent
CORN INVESTIGATIONS C. P. HARTLEY Physiologist in Charge	Breeding and selection of field corn, sweet corn for canning, etc.; tests of fertilizers and cultural methods; encouragement of selection	Mr. Hartley, assisted by Ernest B. Brown, Curtis H. Kyle, and L.L. Zook
COTTON BREEDING INVESTIGATIONS A. D. SHAMEL Physiologist, and D. N. SHOEMAKER Expert, Jointly in Charge	Breeding of cottons for northern Texas; laboratory investigations of cotton Breeding of cottons for northeastern and southern Texas and for Louisiana Breeding of cottons for Tennessee and Arkansas; increasing oil content of seed; etc. Breeding of cottons for South Carolina; demonstrations of fertilization, crop rotation, etc. Cooperative cotton breeding demonstrations in Georgia and adjacent territory	Dr. Shoemaker D.A. Saunders, Special agent S.M. Bain, Special agent E.B. Boykin, Special agent Mr. Shamel, assisted by H.A. Allard
TOBACCO INVESTIGATIONS AND FARMERS' COOPERATIVE BREEDING WORK A. D. SHAMEL Physiologist, and E. H. MATHEWSON Technologist, In Charge	Breeding, rotation, and demonstration work with tobacco, corn, wheat, oats, asparagus, etc. Cigar tobacco investigations in (1) Conn.; (2) N.Y.; (3) Fla., Ga., Tex., and Ala.; and (4) Ohio Export and manufacturing tobacco investigations in (1) Va.; (2) Md.; (3) N.C.; (4) Ky. and Tenn.; demonstrations in crop rotation, etc. Chemico-physiological studies on tobacco, etc.; devising of improved methods of testing, etc.	Mr. Shamel, assisted by J.B. Norton Mr. Shamel, assisted by (1) J.B. Stewart; (2) G.W. Harris; (3) W.M. Hinson Mr. Mathewson, assisted by (1) W.W. Green; (2) D.E. Brown; (3) T.B. Hutchison; (4) H. Woosley W.W. Garner, Physiologist, assisted by C.L. Foubert
SUGAR BEET INVESTIGATIONS C. O. TOWNSEND Pathologist in Charge	Extension of sugar beet culture; development of single-germ seed; improvement of beets; control of diseases of sugar beets; etc. Investigations of beet sugar production Development of home production of beet seed	Dr. Townsend, assisted by E.C. Rittus, H.R. Shaw, Nellie A. Brown, and Clara O. Jerison C.F. Saylor, Special agent J.E.W. Tracy, Assistant, and J.F. Reed
ALKALI AND DROUGHT RESISTANT PLANT BREEDING T. H. KEARNEY Physiologist in Charge	Breeding and testing of resistance of crops to alkali and drought; development of Egyptian cotton culture in the Southwest; study of the physiology of alkali and drought resistance	Mr. Kearney, assisted by H.L. Shantz and A.C. Dillman
TAXONOMIC AND RANGE CRAFTING INVESTIGATIONS FREDERICK V. COVILLE Botanist in Charge	General supervision of investigations; improvement of grazing areas on the National Forests Preparation of a manual of the American grasses; studies in systematic agrostology Compilation of information on economic plants Economic collections of cultivated plants; identification of new and introduced plants; etc.	Mr. Coville A.S. Hitchcock, Systematic agrostologist, assisted by Agnes Chase W.E. Safford, Assistant curator W.F. Wright, Botanist, assisted by P.L. Ricker, C.F. Wheeler, and H.C. Skeels
FOREIGN SEED AND PLANT INTRODUCTION DAVID FAIRCHILD Agricultural Explorer in Charge	Direction of agricultural explorations; propagation and testing of foreign seeds, plants, etc.; miscellaneous plant introductions Agricultural explorations in the Orient, viz: (1) China and eastern Asia; (2) Siberia and central Asia; (3) Japan (bamboo explorations) Malting barley investigations and introduction Malt plant investigations and introduction Operation of special testing gardens at (1) Chicago, Ill.; (2) Brownsville, Tex.; (3) Miami, Fla.	Mr. Fairchild, assisted by Walter Fischer, R.A. Young, and F.P. Chisolm Agricultural explorers: (1) Frank N. Meyer; (2) N.E. Hanceen; (3) Wm. D. Hills Albert Mann, Expert, assisted by Dana W. Fries Mr. Fairchild, assisted by F.W. Clarke In charge of (1) W.W. Tracy, Jr.; (2) E.C. Orson; (3) P.J. Winter
FORAGE CROP INVESTIGATIONS C. V. PIPER Agrostologist in Charge	General testing of forage crops; propagation and distribution of seed of valuable varieties Alfalfa and clover introduction and extension Testing, extension, and improvement of new and standard grasses Cowpea and soy bean investigations Sorghum investigations and extension Testing of forage and cover crops for the Gulf coast region	Prof. Piper, assisted by Roland McKee, M.W. Evans, and W.J. Morse J.W. Westgate, Assistant agrostologist, and Nickolas Schmitz R.A. Oakley, Assistant agrostologist, and H.N. Vinall Prof. Piper, assisted by H.T. Nisles Prof. Piper, assisted by A.P. Conner S.M. Tracy, Special agent
SEED DISTRIBUTION Directed by the CHIEF OF BUREAU; Lisle Morrison, in general charge	Regular distribution of varieties of vegetable, flower, grass seeds; bulbs, vines, plants, etc. Distribution of select varieties of cotton, tobacco, and melon seeds; citrus trees, etc.	Mr. Morrison and J.E.W. Tracy Mr. Morrison, in cooperation with various officers of the Bureau





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Of the Work of the  
BUREAU OF PLANT INDUSTRY  
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WASHINGTON  
1909



# R E F E R E N C E      B O O K

## BUREAU    OF    PLANT    INDUSTRY

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### SYNOPSIS OF THE WORK OF THE BUREAU

The Bureau of Plant Industry is authorized to expend for the fiscal year 1909 the sum of \$1,348,576.\* Of this amount \$187,410 is for statutory salaries, chiefly of the clerical force; \$258,000 for the purchase and Appropriations distribution of seeds; \$6,900 for special tests of paper-manufacturing plants; and the remainder, \$896,266, is apportioned among the various lines of investigation, experiment, and demonstration conducted by the Bureau in all parts of the country. The map at the end of this pamphlet will show in detail the geographical distribution of the Bureau's work. Cooperation with the Agricultural Experiment Stations of every State and Territory, with one exception, is in effect in one or more branches of the work of the Bureau. All of the work of the Bureau is conducted on the project plan, each office or laboratory having in charge a definite group of projects. The organization of the Bureau is such as to place direct responsibility on the officers in charge of the various lines of investigation. All general administrative work is handled by the Chief and Organization

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\*These figures are exclusive of an immediately available fund of \$50,000 from the appropriations for the fiscal year 1910, which amount in the aggregate to \$1,709,266.



the Assistant Chief of Bureau, together with their respective staffs. The Bureau has over 1,000 employees, about two-thirds of whom are engaged in scientific work. The organization of the Bureau, as well as the principal officers and their assistants, are shown on the chart facing the title-page of this pamphlet. The Bureau handles in the course of a year about a quarter of a million letters; it issues about 6,000 requisitions; and audits about 12,000 accounts. It prepares and issues bulletins and other publications embodying the results of its work, more than 100 new publications having been issued during the last fiscal year. Lists of the principal publications of the Bureau may be had on application.

### PLANT PATHOLOGY

The pathological investigations of the Bureau are conducted both in the laboratory and in the field. A central working laboratory, the basis for all studies of plant diseases under way in the Bureau, is maintained. The laboratory investigations at present cover diseases of the clive, sugar cane, cocoanut, tobacco, alfalfa, clover, cereals, sugar beets, and many other plants. In connection with the laboratory, economic collections of mycological and pathological material are maintained.

Work on fruit diseases is being conducted both in the laboratory and in the field, the latter phase consisting of experiments and demonstrations in the control of the diseases of fruits and fruit trees. The orchard diseases receiving attention are pear blight, "little peach," bitter rot of the apple, brown rot of peaches

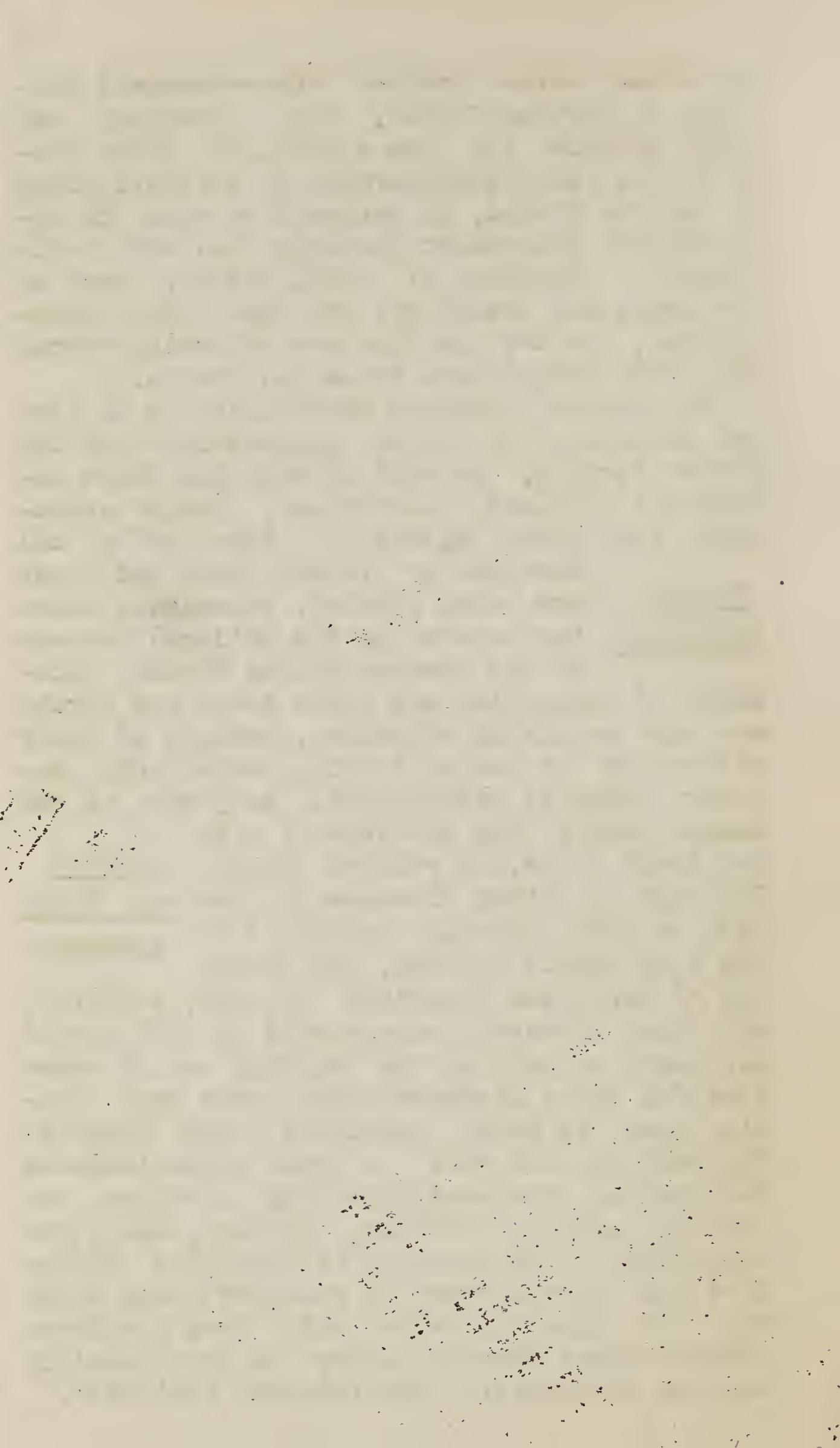


and other stone fruits, the crown-gall diseases of various fruits, etc. Spraying and other methods for the control of these diseases are being demonstrated in infected areas in various States, in cooperation with the Agricultural Experiment Stations and with individuals. Diseases of small fruits, such as the grape and cranberry, are also being investigated, as are the diseases affecting citrus and other subtropical trees and fruits.

The Bureau conducts investigations in forest pathology in close cooperation with the Forest Service, as well as with the State experiment stations, nurserymen, lumber companies, and other agencies. Practically all diseases of forest trees and woods are being studied, especially those encountered in the National Forests of the western United States. Diseases of ornamental and shade trees and shrubs are also receiving attention, methods of their prevention or control being worked out. Another group of pathological projects of the Bureau covers the diseases of cotton, truck crops, and related plants.

Forest Pathology Cotton  
The work on cotton diseases is carried on with special reference to the boll weevil problem, the breeding of varieties resistant to wilt, root-rot, and other diseases encountered in boll weevil sections, as well as the working out of remedies for those diseases, being under way. Similar work is being conducted with cowpeas. The pathological work on truck crops includes the various diseases affecting potatoes, cucumbers, melons, lettuce, spinach, and other vegetables, the breeding of resistant varieties and the discovery of remedies being under way. In connection with this work a comprehensive plant disease survey is made annually and the information thus obtained published.

and Truck Diseases

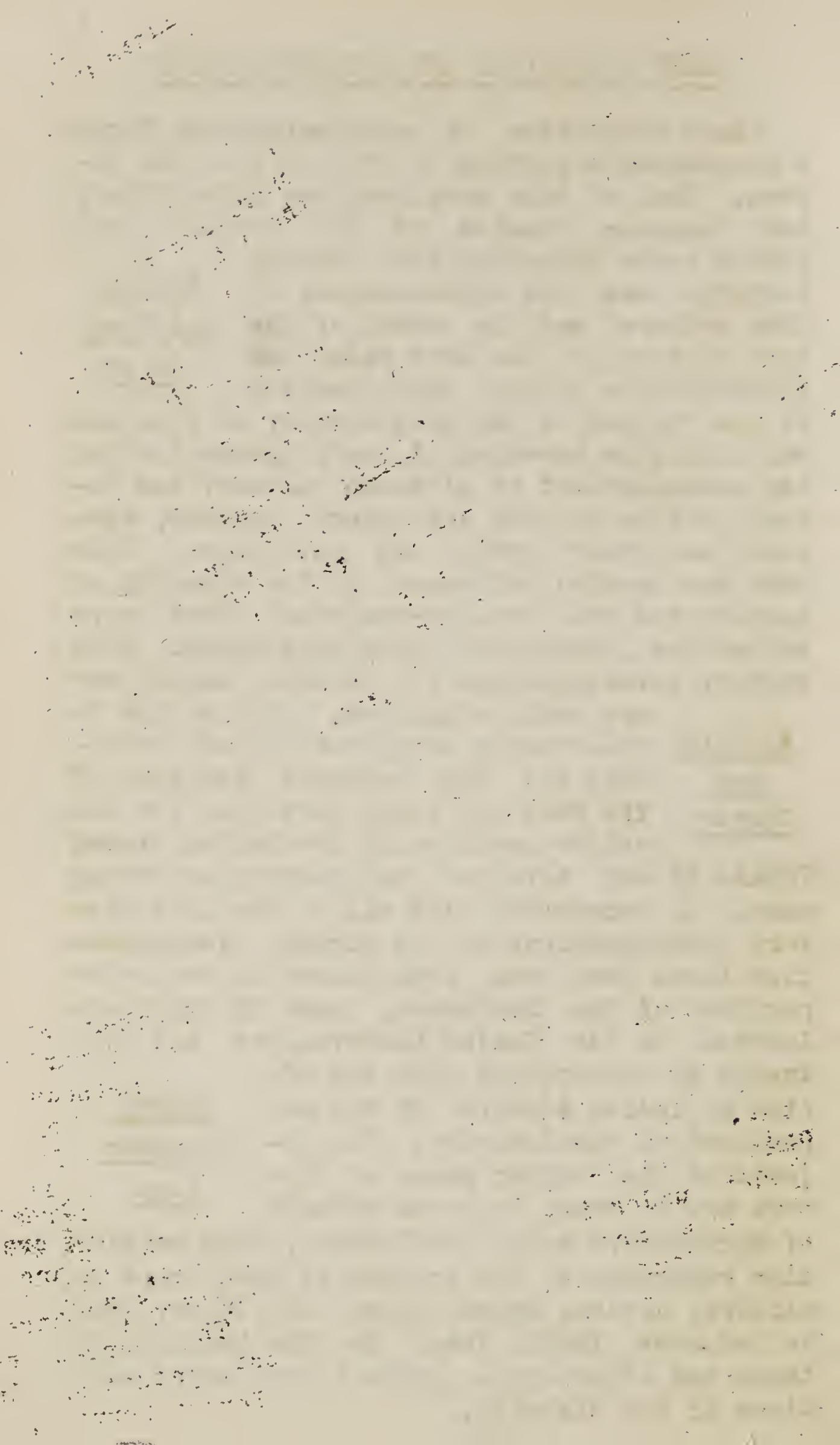


## PLANT PHYSIOLOGY AND ACCLIMATIZATION

Plant adaptation or acclimatization forms a considerable portion of the work of the Bureau. Much of this work involves life history and bionomic studies of the various crop plants under investigation. Leading features are the establishment of Fruits date culture and the study of the and Tree life history of the date palm; an investigation of the caprification Crops of the fig and of the life history of figs and caprifigs; the breeding of hardy citrus fruits; the establishment of pistache culture; and investigations of wild and desert peaches, almonds, and other fruit and nut crops. This work has special reference to the securing of deep-rooted and drought-resistant tree crops suited for growth under arid conditions. Life history investigations of alfalfa and clover

Alfalfa are being conducted, with a view to discovering drought-resistant varieties for the semiarid portions of the West and hardy varieties for the colder sections of the United States. and Clover

Trials of new alfalfas and clovers are being made. In connection with all of the life history investigations of the Bureau, demonstration farms have been established in the drier portions of the Southwest, some of which are located on the Indian Reservations and conducted in cooperation with the Office of Indian Affairs of the Department of the Interior. The objects of the latter phase of this work are to teach improved methods of agriculture among the Indians, with particular reference to the growing of such crops as alfalfa, cotton, dates, figs, and olives; and to educate Indian labor in the handling of these and other crops grown by the white settlers in the vicinity. Indian Cooper-  
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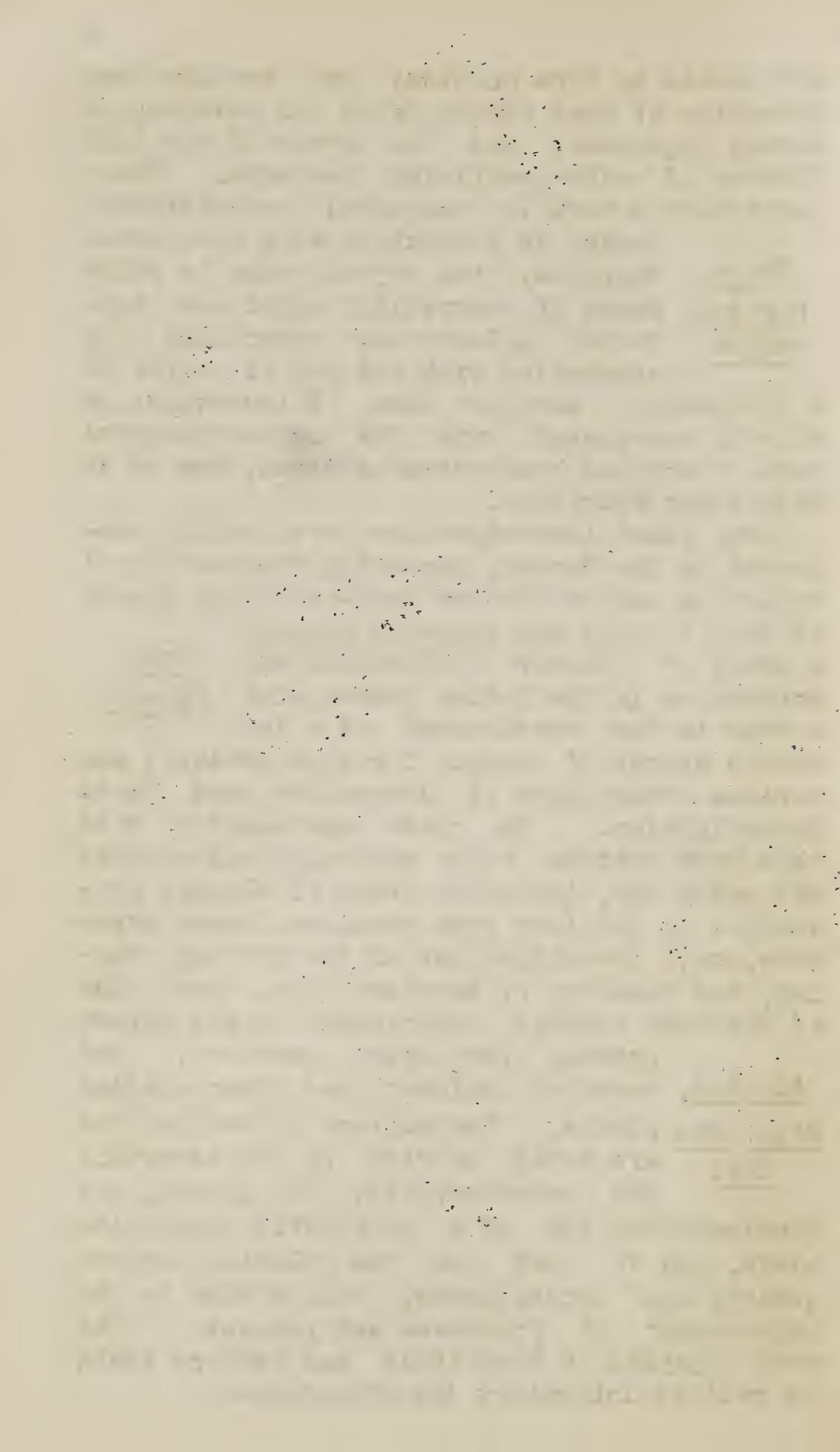


The bionomic investigations of the Bureau include in a general way all crops originating in tropical countries, but at present chief attention is being given to the adaptation of tropical varieties of cotton and corn to conditions in the southwestern United States. Weevil-resisting varieties of Central American cotton are being acclimatized in the South, as well as drought-resistant varieties, in order to extend cotton culture into the drier regions where the weevils are less injurious. Experiments are also under way with Central and South American varieties of corn adapted to special conditions of moisture, drought, and irrigation, to acclimatize them in parts of the South and West where our present varieties do not thrive. Other tropical crops receiving attention are rubber, the mango, avocado, cacac, and banana.

### GENERAL PLANT PHYSIOLOGY

The Bureau conducts investigations in soil bacteriology and water purification. The former line consists of the isolation of various types of soil bacteria and the correlation of their economic value; an investigation of the bacteria concerned in nitrification and of their rôle in plant nutrition, as well as of the probable correlation of bacteriological activity in the soil with cultural conditions. Experiments with legume bacteria are being conducted in connection with this work, consisting of the distribution of pure liquid cultures of nitrogen-fixing bacteria for inoculating leguminous plants; the study of the conditions under which nodule-forming bacteria

Soil  
Bacteri-  
cology



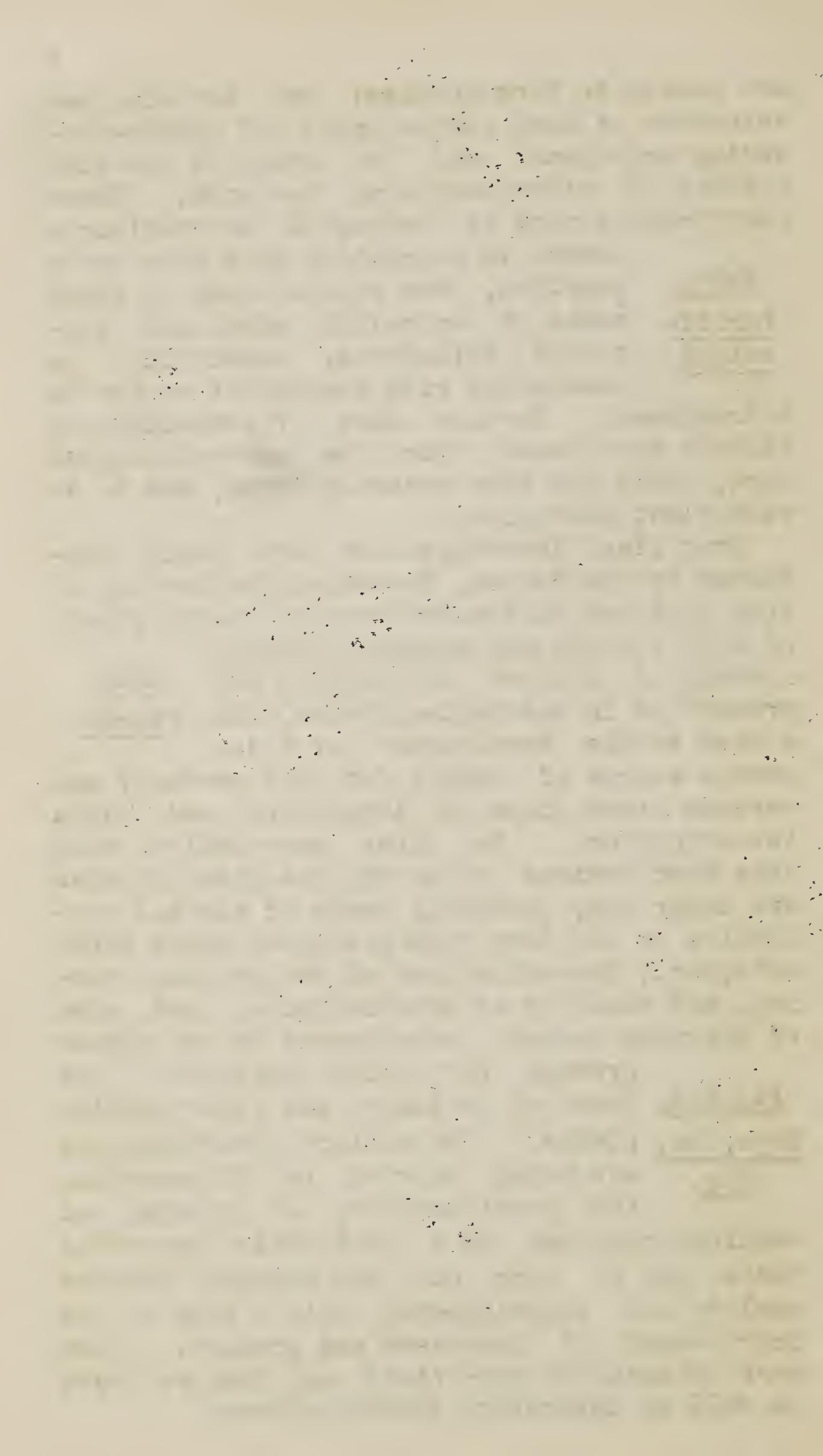
are unable to form nodules; the breeding and selection of more virile types of nodule-producing organisms; and the study of the life history of nitrogen-fixing bacteria. Water purification work is conducted as conditions

Water demand in connection with farm water supplies, the object being to study Purifi- means of controlling algal and bac-cation terial pollutions, especially in connection with the use of copper as a treatment. Another line of investigation closely associated with the bacteriological work, which has been recently begun, has to do with plant nutrition.

Drug plant investigations are being conducted by the Bureau, including the testing of both wild and cultivated drug-producing plants, of both foreign and domestic origin; a study of camphor utilization and Drug production in the United States, with Plants a view to the development of a domestic source of supply for this product; and various other lines of laboratory and field investigation. In close association with this work various other physiological studies are under way, including tests of alcohol production on the farm from potatoes, waste products, etc.; investigations of the growing, curing, and handling of American hops, and also of American lemons; experiments in red pepper growing for spice purposes; and

Alcohol, tests of perfumery and other special Hops, Tea, plants. Tea culture investigations

Etc. are being carried on to ascertain the practicability of growing and manufacturing tea on a profitable commercial basis, and to work out the relation between quality and constituents, with a view to the improvement of processes and product. The work consists of both field and factory tests, as well as laboratory investigations.



Poisonous plant investigations are being conducted, including chiefly the study of the so-called loco disease of live stock, with a view to its prevention by the eradication of the weeds causing it and by the development of methods of control. Work on other stock-poisoning plants, such as the mountain laurel, larkspur, death camas, and mistletoe, is also under way, antidotes and preventives for these poisons being sought. Considerable attention is being given to a study of the poisonous plants found on the National Forests and to working out methods for exterminating them. This phase of the work is conducted in close cooperation with the Forest Service.

Poisonous Plants

### AGRICULTURAL TECHNOLOGY

The technological work of the Bureau on various crops is conducted both in the laboratory and in the field. The laboratory work includes the development and improvement of

Laboratory

apparatus and machinery used in practical agricultural work; technological studies of cereals, including biological analyses of various grains; and other lines of work in cooperation with various offices of the Bureau, having for their object the improvement of methods of handling and growing crops.

In connection with these investigations work is being conducted in the Cotton cotton States having for its objects Standardization the improvement of methods of preparing, ginning, baling, and marketing cotton, with a view to lessening damage and standardizing the commercial grades of cotton, in accordance with recent legislation. Closely associated with this work is the study of cotton



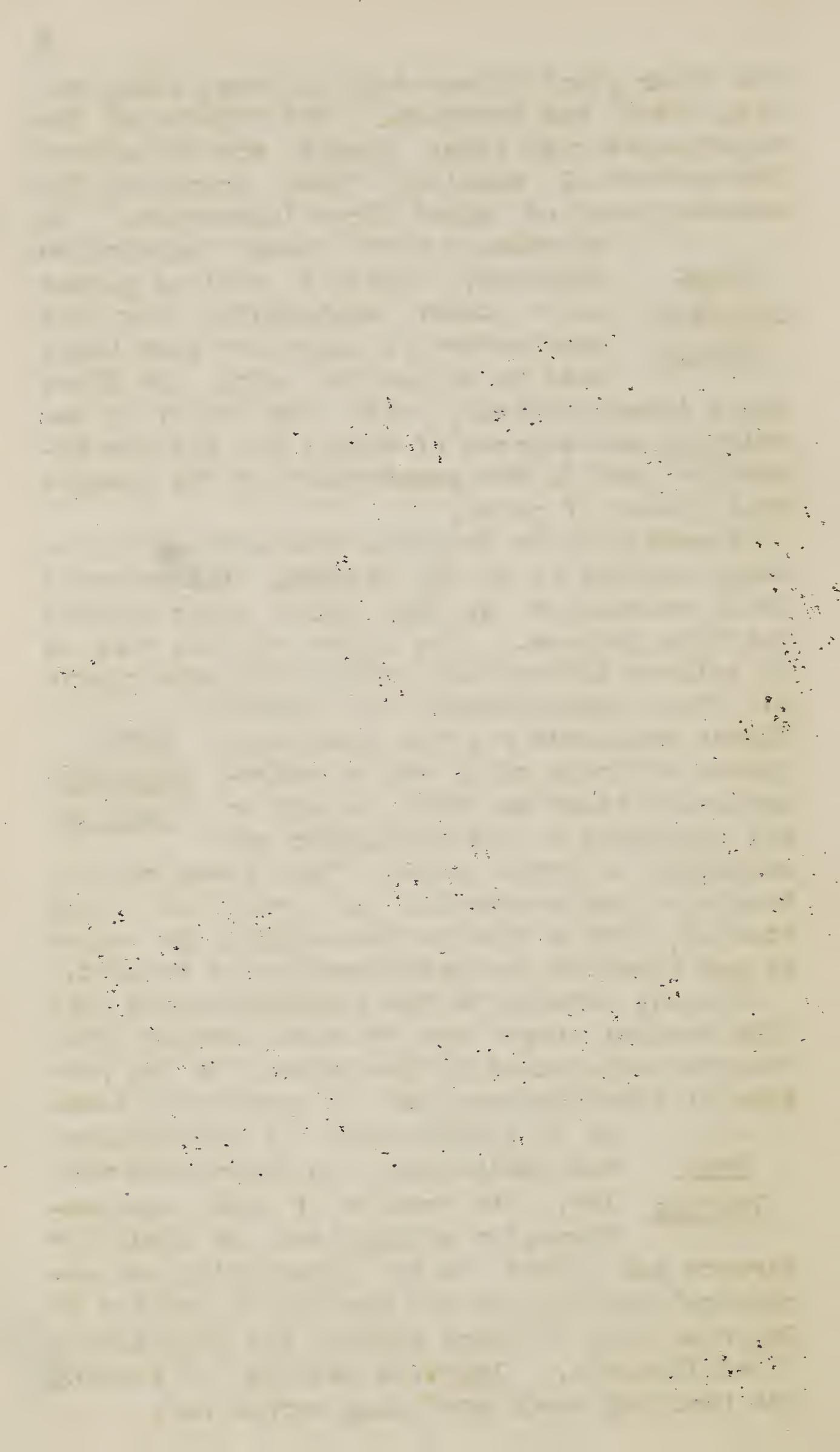
and other plant fibers such as hemp, flax, ramie, sisal, and henequen. The objects of the experiments with these plants are to improve the methods of handling fiber crops and the encouragement of plant fiber industries. In

Fiber and Paper Plants accordance with recent legislative authority, tests of various plants as to their suitability for the manufacture of paper are also being made in connection with the fiber plant investigations, with the object of developing new sources of supply for the raw materials used in the manufacture of the commercial grades of paper.

Investigations in grain standardization are being carried on by the Bureau, laboratories being maintained at the chief grain centers for this purpose. The object of this work is to collect information which will make possible the establishment of United States standards for the commercial Grain Standardization grades of grain, which can be mathematically fixed and will be fair to all concerned in the production and marketing of grain crops. The ocean and interstate transportation of grain is being studied, with a view to determining the causes of and remedies for deterioration in transit.

Closely related to the standardization work with various crops are the seed testing laboratories maintained by the Bureau for the purpose of examining samples of commercial seeds

Seed Testing as to the presence of adulterants, and publishing, in accordance with law, the results of such examinations; for making tests of seeds for farmers and others as to germination and mechanical purity; and the testing of samples of imported seed to guard against the importation of adulterants. Improved methods of testing and handling seeds are being worked out.



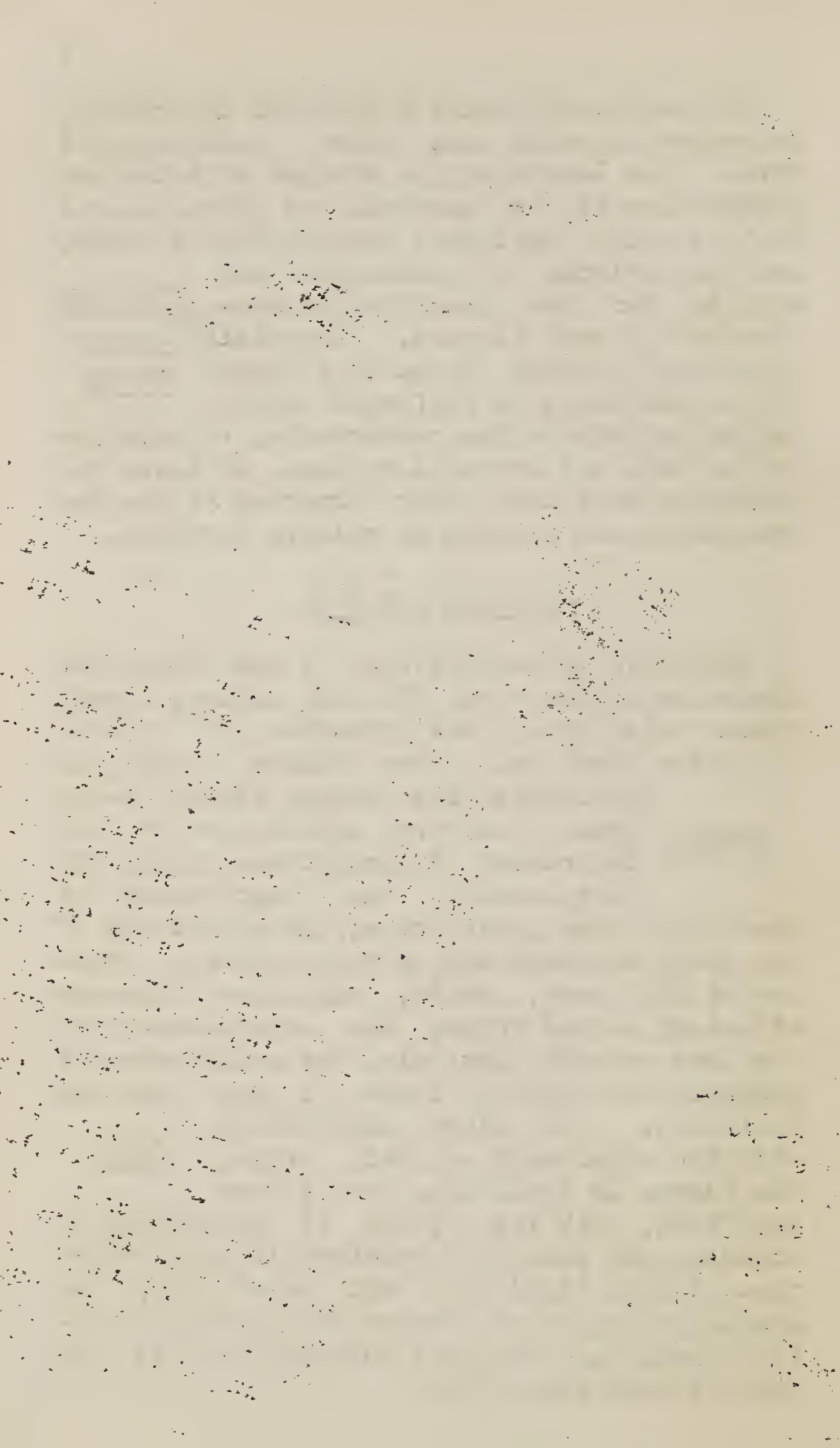
The Bureau maintains a Physical Laboratory, in connection with its other technological work. This laboratory is charged with the determination of the physical and physiological factors which influence the growth of crops, and the devising of instruments and methods for the quantitative measurement of such factors. Especial attention is being given to a study of the influence of different cultivation methods on the conservation of moisture in the arid and semiarid regions, in close co-operation with the other branches of the Bureau which are working on related problems.

Physical  
Labor-  
atory

### AGRONOMY

The grain investigations of the Bureau include adaptation work with rye, barley, wheat, winter oats, etc.; the extension of the area of winter wheat and other winter grains; experiments with durum wheat, a new Grains grain industry established by the Department of Agriculture during the last decade; the improvement of wheat and other grain crops; investigations of the grain sorghums and of rice culture; studies of the rusts, smuts, and other diseases affecting cereal crops; and experiments with dry land cereals, including the maintenance of cooperative testing farms in the West and Southwest. In close affiliation with the other work on grain crops, the Bureau is conducting corn investigations, with the objects of developing by breeding and selection greater yielding varieties of both field corn and sweet corn, and demonstrating among farmers the increased profits resulting from good cultural methods and careful seed selection.

Corn



Under the general heading of cotton breeding investigations the Bureau is conducting experiments and demonstrations in the development of early varieties of cotton for boll weevil sections, as well as long-staple races

and pedigreed strains of short-staple varieties for various conditions.

Cotton Breeding The objects are to obtain increased yield, longer and better fiber, earliness of maturity to prevent injury by the boll weevil, and to encourage among growers the cooperative breeding of cotton, careful seed selection, and improved cultural methods. Attention is also being given to the breeding of winter crops for cotton fields.

The tobacco investigations of the Bureau have for their objects the improvement, by breeding and selection, of cigar wrapper and filler tobaccos, smoking and export tobaccos, etc.; the improvement of farm practice and cultural methods with tobacco, including demonstrations of crop rotation in tobacco fields; the combatting of the diseases of tobacco; the testing of the burn and other qualities of the new varieties of tobacco developed; and the securing of suitable cover crops for tobacco fields, such as vetches, oats, etc. In connection with this work, experiments in breeding rust-resistant asparagus are under way.

The Bureau is conducting sugar beet investigations with the object of developing single germ seed, improving cultural methods, determining the best fertilizers for sugar beets, the best methods of silo-

Sugar Beets ing seed beets, etc. The diseases of the sugar beet, such as curly-top and leaf-spot, are being studied, and methods of their prevention are being worked out. The area of sugar beet culture is being extended,



and strains which will withstand alkali and drought are being secured by breeding and selection. Experiments are also being carried on in the development of high-grade strains of American-grown sugar beet seed.

### PIONEER WESTERN AGRICULTURE

A considerable portion of the work of the Bureau is concerned with the upbuilding of a profitable agriculture in the arid and semi-arid parts of the West and Southwest, both on irrigated and unirrigated lands. Methods of dry land agriculture for the Great Plains Area are being devised, including crop rotations and methods of soil preparation; and stations at which the various problems encountered in farming under arid conditions may be studied have been established throughout the region. Similar investigations are under way on the

Reclaimed Land Farming lands recently brought under irrigation by the Reclamation Service of the Department of the Interior, this work being conducted in close cooperation with that Service. The agricultural possibilities of these lands are being studied, and crops suitable for cultivation thereon are being secured by adaptation or breeding. The alkali and drought resistant plant breeding investigations cover such crops as forage grasses, leguminous forage plants, millets, sorghum, Egyptian cotton, the date palm, olive, and pomegranate, in addition to the other crops previously referred to, such as sugar beets, cereals, etc. Special attention is being given to the adaptation of Egyptian cotton in the Southwest.

Dry

Land

Farming

Resistant

Plant

Breeding



## FARM MANAGEMENT

The Bureau conducts farm management work in all parts of the country. A large part of the work is conducted by districts, each district including a group of States. In these districts object-lesson farms are conducted for the purpose of stimulating interest in the diversification of crops, improved methods of farm practice, etc.

### Farm Districts

In the boll weevil territory the desirability of a wider diversification of crops is being demonstrated. Investigations of special phases of farming are being carried on throughout the United States, including studies of farm practice in maintaining soil fertility; in the culture of cereals, potatoes, and other crops; in the production of forage for beef cattle, hogs, and sheep; in the eradication of weeds; in hay production, and in various other phases of farming. Studies in the economics of farming are being made also, including farm accounts, records, equipment, etc., and the cost of all classes of farm operations.

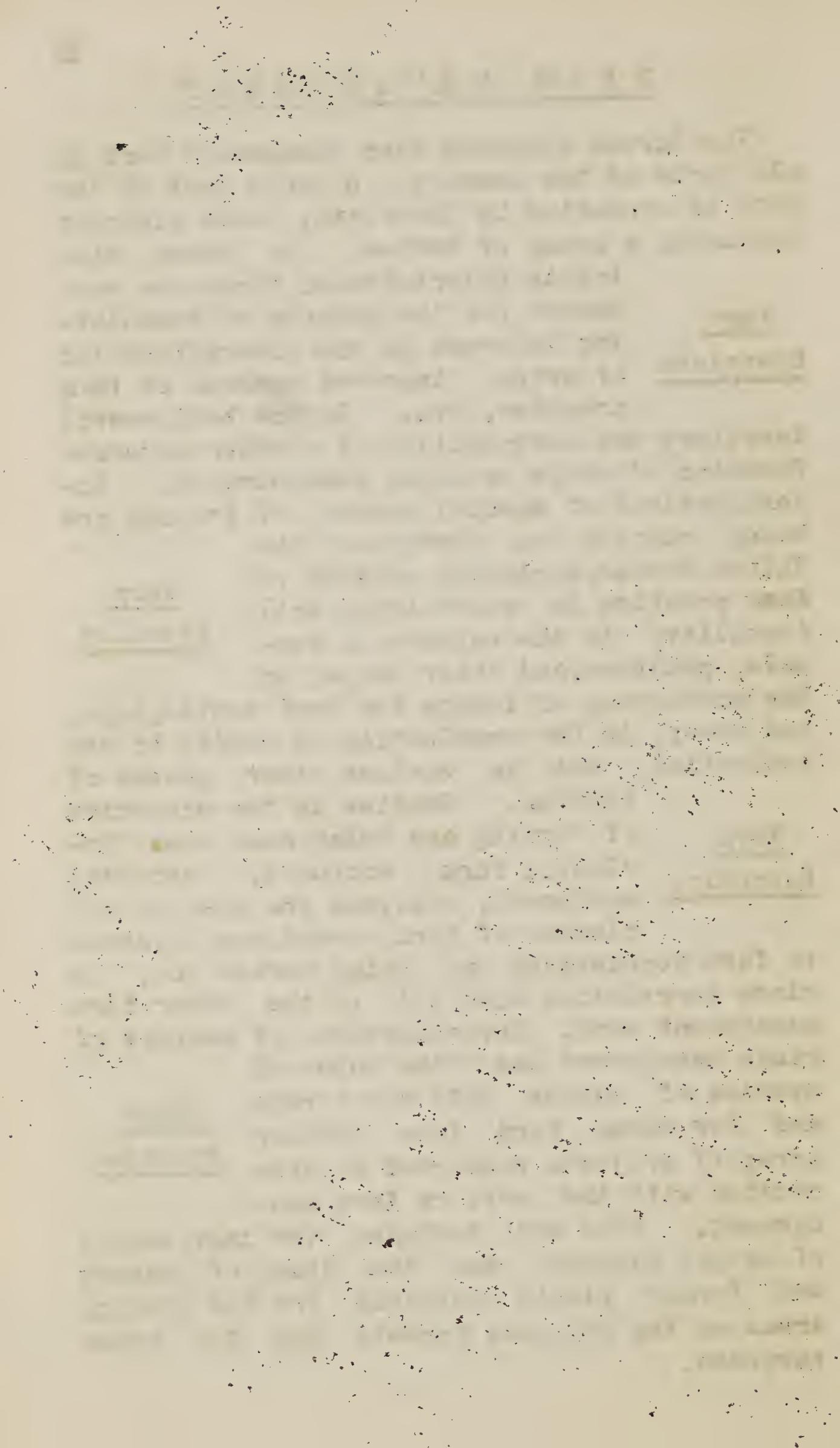
### Farm Economics

Systems of farm bookkeeping are being worked out, in close correlation with all of the other farm management work. Investigations of methods of range management and of the value of species of cactus both for forage and for human food form another group of projects conducted in connection with the work on farm management. This work includes the improvement of native pastures and the study of grasses and forage plants suitable for the grazing areas on the National Forests and for other purposes.

### Farm Practice

### Practice

### Range Practice



## FARMERS' COOPERATIVE DEMONSTRATION WORK

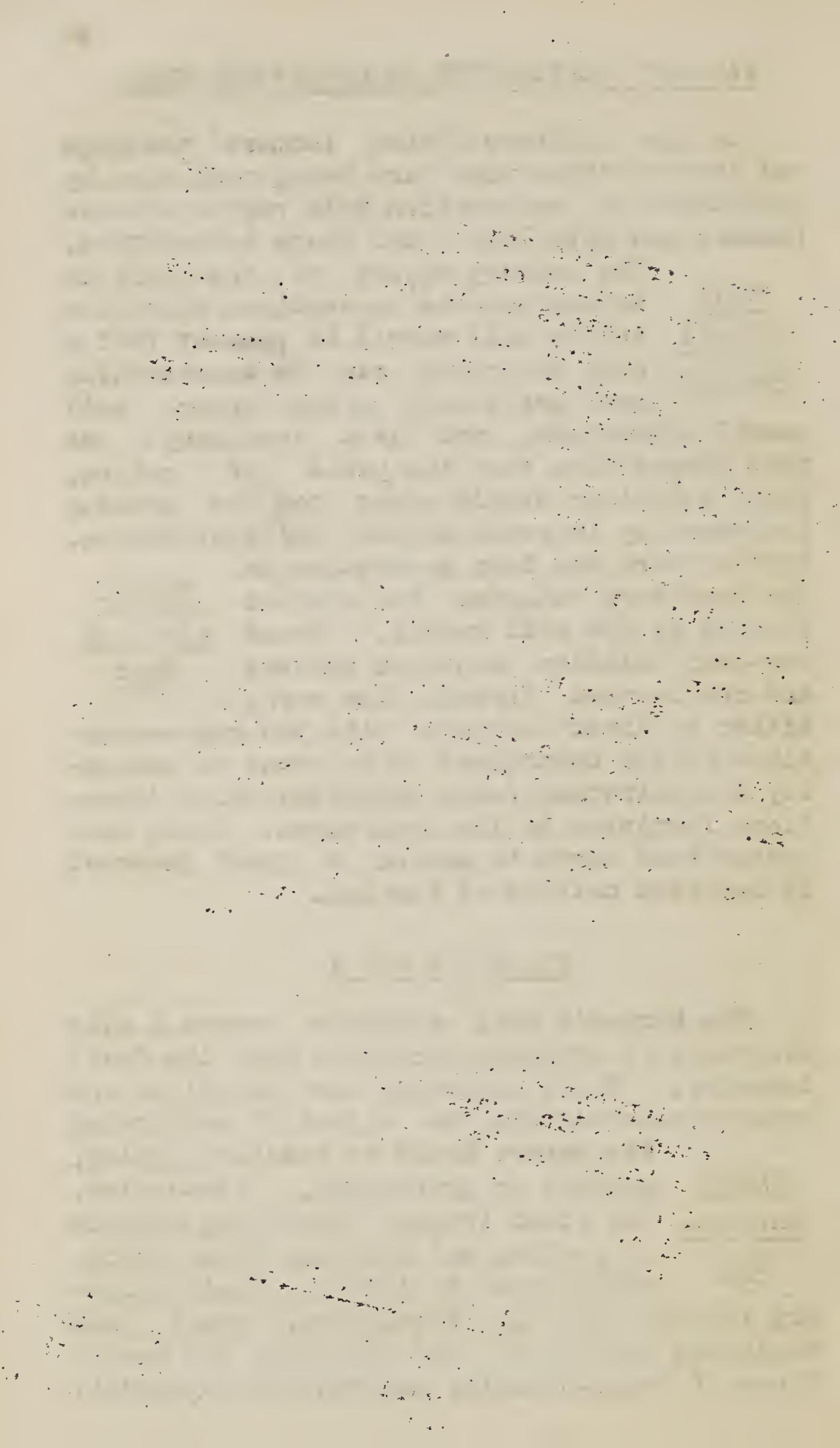
In the Southern States farmers' meetings and demonstration work are being conducted by the Bureau in cooperation with representative farmers and with local and State authorities.

The primary object of this work is to demonstrate in sections where the Boll Weevil cotton boll weevil is present that a Section crop of cotton can be successfully and profitably grown under boll weevil conditions, and as a corollary to this proposition that the yield of cotton, corn, and other staple crops can be greatly increased by improved methods of cultivation. Similar work has been undertaken in the territory outlying the section Extensive invaded by the boll weevil. About sion of one-half million southern farmers Work are now reached through this work, either by direct contact with the representatives of the Department or by means of community demonstration farms conducted under directions furnished by the Department. These demonstrations serve to awaken a great interest in improved methods of farming.

## POMOLOGY

The Bureau's work on fruits covers a wide diversity of problems connected with the fruit industry. Fruit marketing investigations are being conducted with the object of developing

Fruit the export trade in peaches, apples, pomelos or grapefruit, pineapples, Market- and other fruits; improving methods ing of packing and handling these fruits, with a view to insuring their delivery to consumers in attractive, sound, and wholesome condition; and improving the conditions of trans-Atlantic exportation in general.



Fruit transportation and storage investigations are being carried on with the object of determining the factors which govern the successful shipping and keeping of perishable fruits; to bring about improvements, especially in packing house and refrigerator car practices; and to determine Fruit Transportation practical methods of farm fruit storage. These investigations are concerned with both citrus fruits and deciduous fruits, particularly in California and Florida. Fruit district investigations are being conducted by the Bureau, with a view to

Fruit Districts determining the adaptability of different varieties to the various orchard sections. This work has a direct bearing on the development of the fruit growing industry, as it aims to supply the fruit grower with accurate information regarding the adaptability of varieties. The adaptability of varieties to dry land conditions is being ascertained. Viticultural investigations are being carried on in various parts of the country, and have to do with the development of the Vinifera and the Viticulture Rotundifolia grape industries, and the handling, keeping, marketing, and utilization of grapes and grape products. Pomological collections are maintained in connection with the fruit investigations of the Bureau.

## HORTICULTURE

In addition to the work on fruits, the Bureau conducts various horticultural investigations, especially with reference to the truck growing industries. On the Arlington estate, in Virginia, the Bureau maintains, as auth-



ized by law, an experimental farm for the testing of varieties of seeds and plants, especially vegetables and flowers. The horticultural work on the Farm includes tests of Irish potatoes, sweet potatoes, and other vegetables; ex-

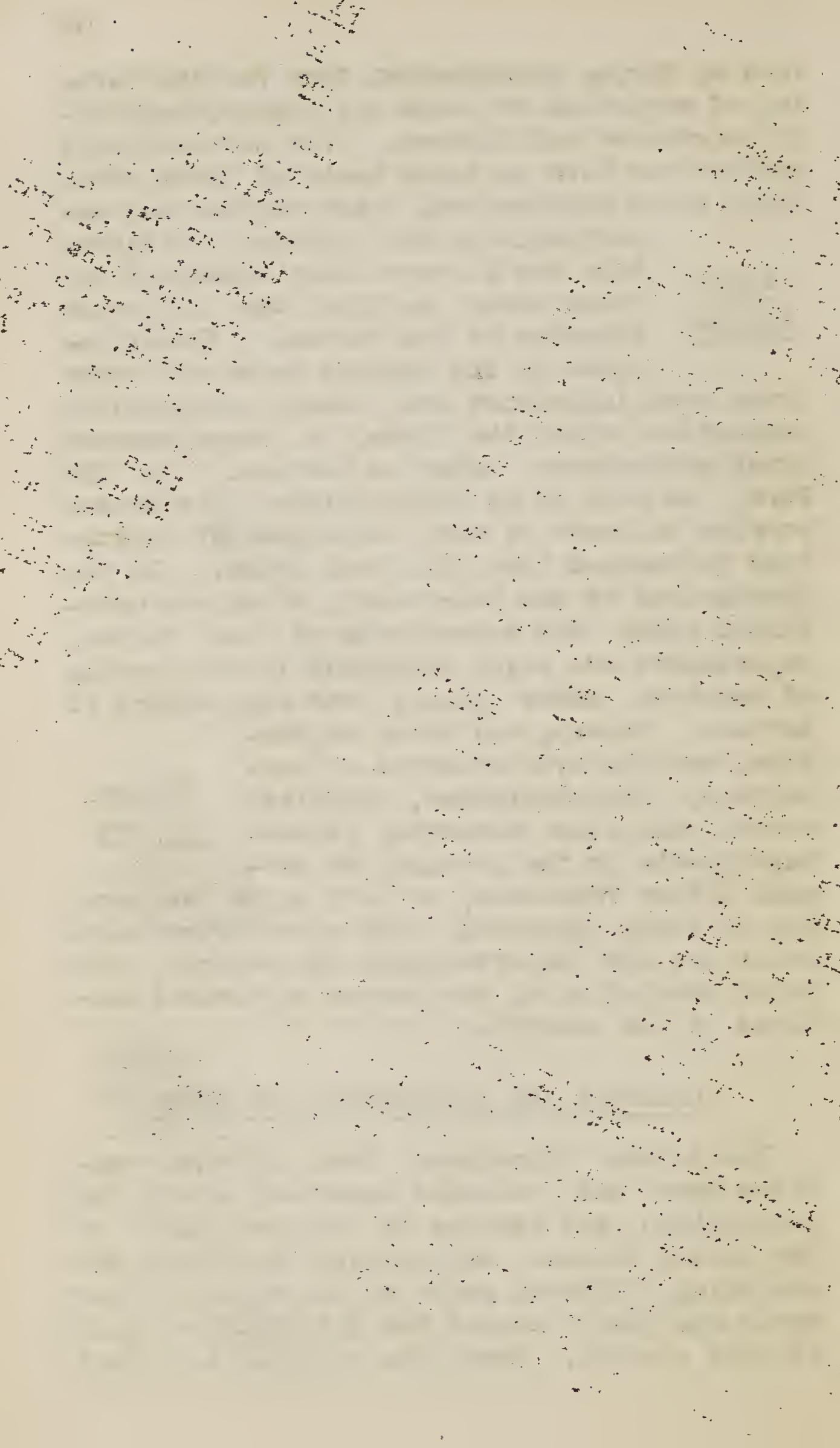
Vege-  
talesperiments in the growing of vegetables and flowers under shade; and various other work of the different branches of the Bureau. Investigations of the Bermuda onion and other

truck crop industries are being conducted in connection with the Farm, a comprehensive truck crop survey being a feature. On the Farm, as well as at other points, the Bureau carries on tests of new varieties of vegetables introduced into the seed trade. In the greenhouses of the Department, which are maintained under the supervision of the Bureau, experiments are being conducted in the growing of tomatoes under glass; the improvement of lettuce, celery, and other vegetables; and the hybridization of carnations, chrysanthemums, dahlias, roses, and other flowering plants. Experiments in the growing of Bermuda lilies from seed, as well as in the growing to tulip, hyacinth, and other Dutch bulbs which are now imported into the country, are being carried on by the Bureau in various sections of the country.

Flori-  
culture

### PURCHASE AND DISTRIBUTION OF SEEDS

The Bureau introduces from foreign countries rare and valuable seeds and plants for propagation and testing in various parts of the United States. Agricultural explorers are searching different parts of the world for new seeds and plants needed for different sections of this country. Among the valuable new plant



industries so established may be mentioned durum wheat, the date palm, disease-resistant varieties of rice, etc. In connection with this work the Bureau maintains plant introduction and testing gardens at various points. Among the plants now under experiment are matting rushes, bamboos, mangos, root crops, forage crops, and vegetables. Scions of

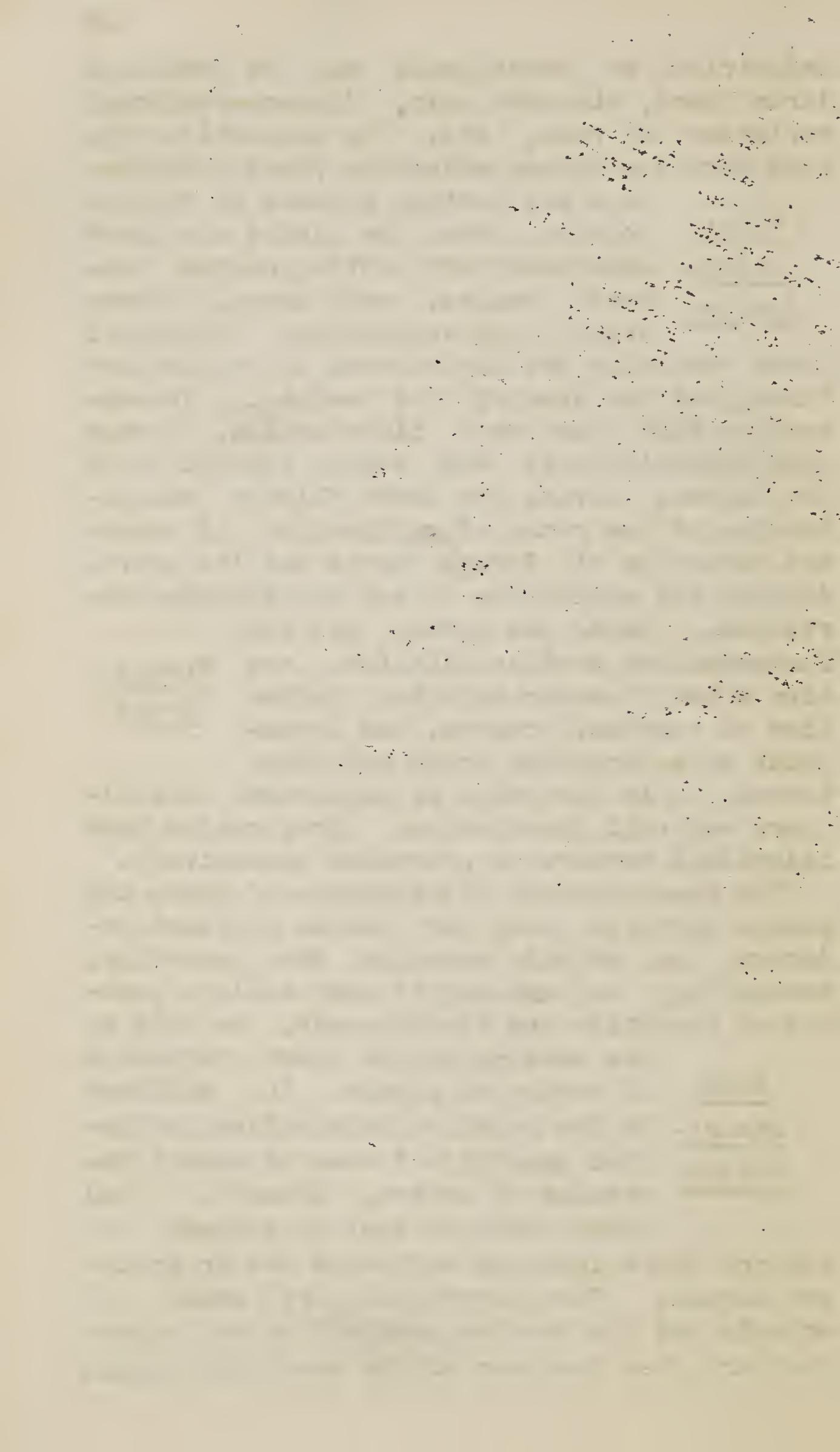
Plant Introduc-  
tion these varieties are distributed to cooperators throughout the country for testing. In connection with the seed distribution, forage crop investigations are being carried on by the Bureau, having for their objects the extension of the range of cultivation of standard varieties of forage crops and the introduction and adaptation of new and improved varieties. Among the latter are the Turkestan and Arabian alfalfas, and also a new Siberian alfalfa. Varieties of sorghum, grasses, and leguminous soil-improving crops are being tested, as is the value of commercial fertilizers and soil inoculation. Cooperation with individual farmers is practiced extensively.

The Congressional distribution of seeds and plants devolves upon the Bureau of Plant Industry, and entails annually the packeting, assembling, and mailing of many million packets of vegetable and flower seeds, as well as

the sending out of other varieties

Seed Distribu-  
tion of seeds and plants. In addition to the regular distribution, a limited quantity of seed of select varieties of cotton, tobacco, and other crops is sent to farmers in regions where improved varieties are in greatest demand. The distribution of seeds to schools and the encouragement of school garden work are also features of the seed distribution.

Forage  
Crops



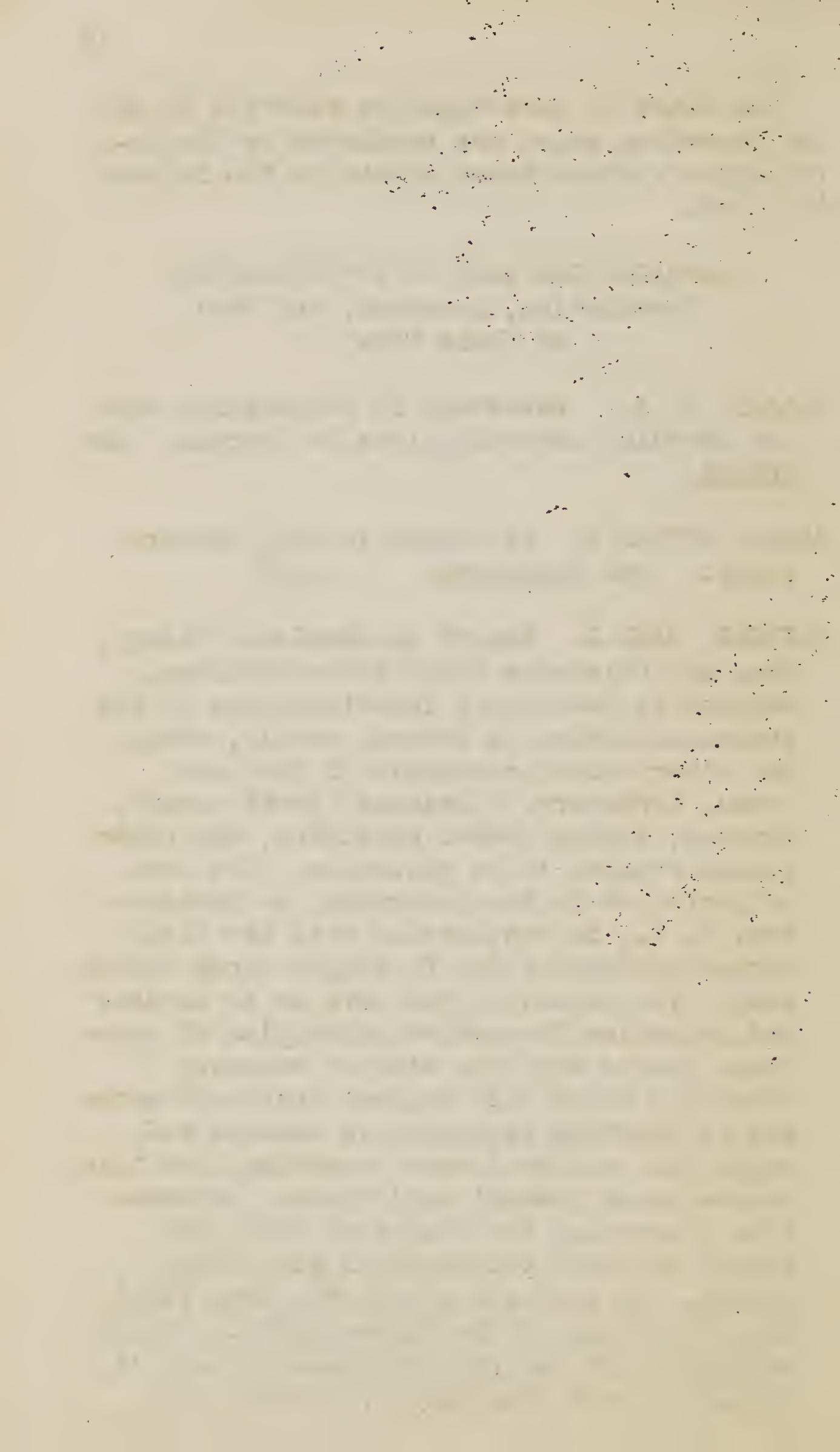
The lines of investigation referred to in the preceding pages are conducted by the investigators whose names appear in the following list.

ALPHABETICAL LIST OF INVESTIGATORS  
Description, Location, and Cost  
of Their Work

ALLARD, H. A. Assistant in cooperative cotton breeding investigations in Georgia. See Shamel.

ALLEN, EDWARD R. Assistant in soil bacteriology. See Kellerman.

ALSBERG, CARL L. Expert in chemical biology, Drug and Poisonous Plant Investigations. Engaged in laboratory investigations of the poisonous action on horses, cattle, sheep, and other domestic animals of the loco weeds, larkspurs, *Zygadenus* (death camas), lupines, sleepy grass, mistletoe, and other plants reputed to be poisonous. The work is performed in the laboratory at Washington, D. C., in conjunction with the field investigations of Dr. C. Dwight Marsh (which see). The object of the work is to isolate and determine the active principles of poisonous plants with the view of securing knowledge which will suggest practical methods of treating poisoning in animals and avoid the serious losses occurring from this source under present conditions. Information concerning the stages at which the plants are most poisonous is also being sought. In connection with the Drug Plant Investigations of the Bureau work is being carried on in the physiological testing of American-grown drug plant products. Ex-



Alsberg, Carl L.--Continued.

penses this year, about \$4,500, of which \$3,000 is for salaries and \$1,500 for traveling and other miscellaneous expenses.

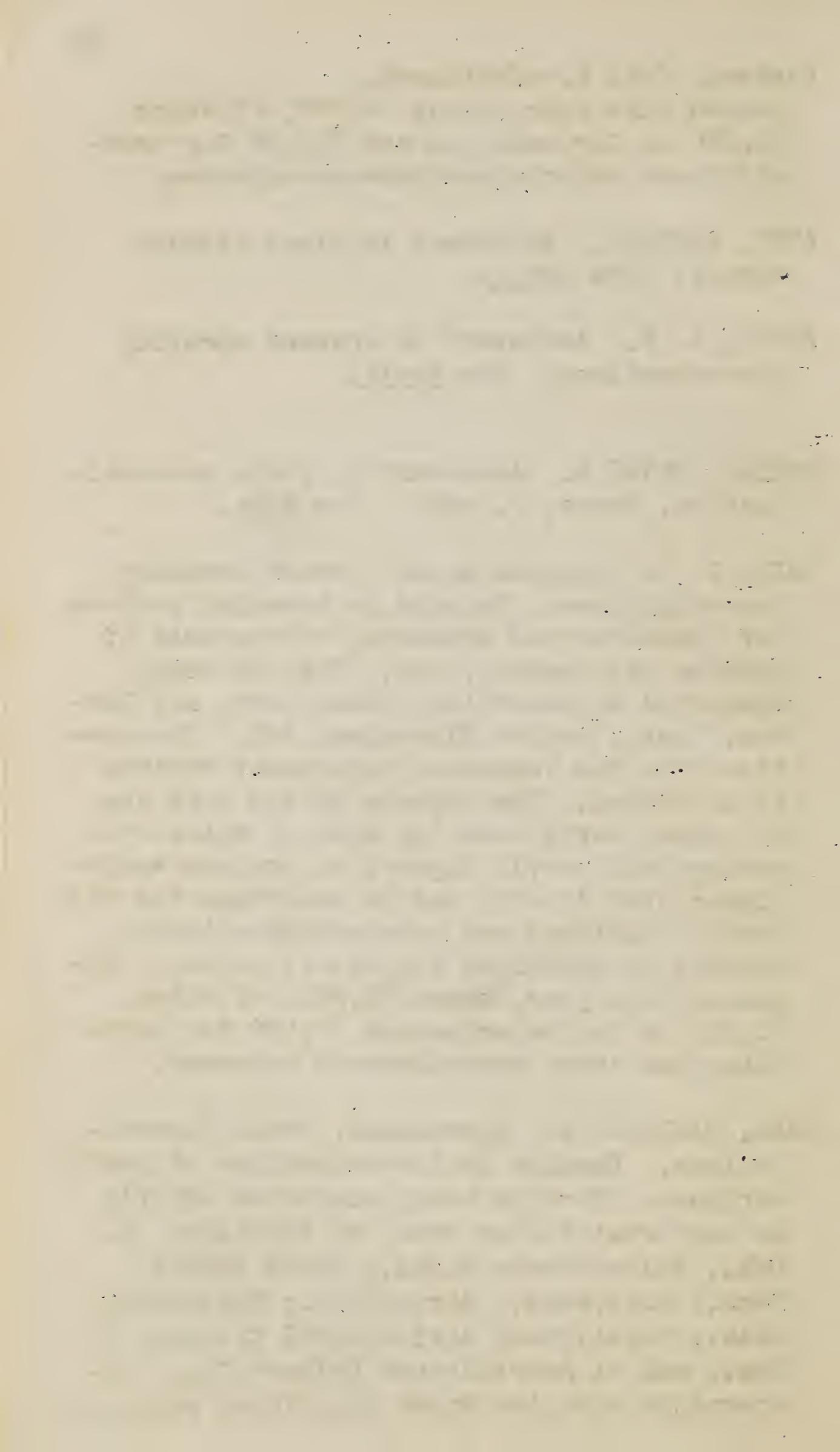
AMES, ADELINE. Assistant in plant disease survey. See Orton.

AYRES, T. W. Assistant in orchard spraying demonstrations. See Scott.

BAILEY, CLYDE H. Assistant in grain standardization, Fargo, N. Dak. See Fitz.

BAIN, S. M. Special agent, Cotton Breeding Investigations. Engaged in breeding cottons for Tennessee and Arkansas, cotton seed of greater oil content, etc. Work is being conducted at Knoxville, Cades Cave, and Warren, Tenn., and at Clarendon, Ark. Cooperation with the Tennessee Experiment Station is in effect. The objects of the work are to secure early maturing cottons which will escape boll weevil injury; to produce varieties richer in oil; and to ascertain the effect of altitude and concomitant climatic factors on pedigreed strains of cotton. Expenses this year, about \$3,300, of which \$2,300 is for salaries and \$1,000 for traveling and other miscellaneous expenses.

BALL, CARLETON R. Agronomist, Grain Investigations. Engaged in investigations of grain sorghums. Work is being conducted chiefly in the Great Plains Area, at Dickinson, N. Dak.; Bellefourche, S. Dak.; North Platte, Nebr.; Hays, Kans.; Akron, Colo.; Stillwater, Okla.; Nephi, Utah; Agricultural College, N. Mex.; and at Amarillo and Dalhart, Tex. Cooperation with the State experiment stations



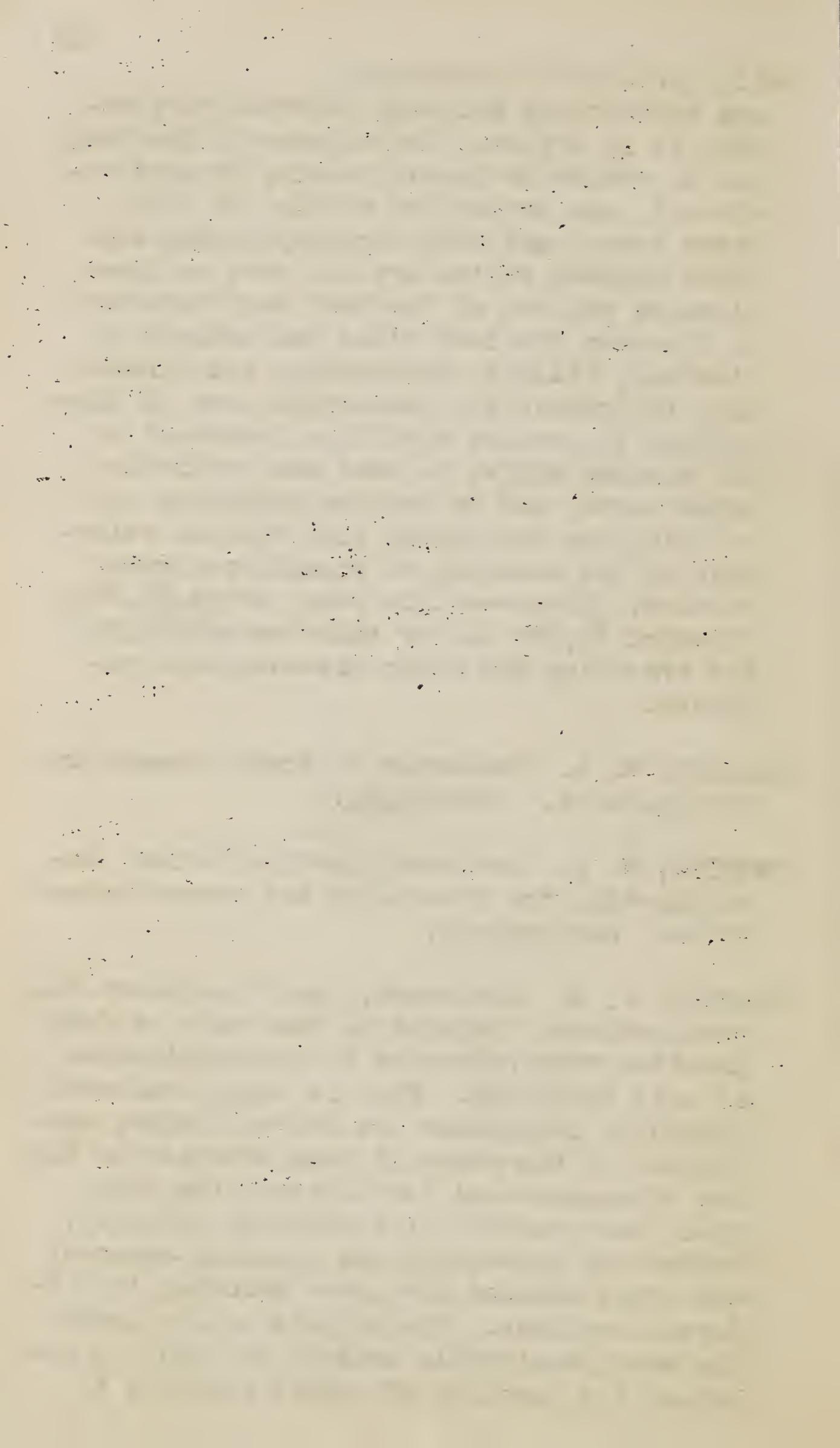
Ball, Carleton R.--Continued.

and substations and with selected cooperators is in effect. The objects of the work are to secure or develop early, drought resistant, and productive strains of milo, kafir corns, and other grain-yielding sorghums adapted to the dry and more or less elevated regions of the West and Southwest; to discover the best times and methods of planting, tillage, harvesting, and threshing; to promote the commercial uses of these grains; to produce varieties resistant to the sorghum midge; to test new or little known sorts; and to improve varieties by breeding and selection, with special reference to the securing of drought resistant strains. Expenses this year, about \$3,500, of which \$2,500 is for salaries and \$1,000 for traveling and other miscellaneous expenses.

BALLARD, W. S. Assistant in fruit disease investigations. See Waite.

BEATTIE, W. R. Assistant horticulturist, investigating the truck crop and peanut industries. See Corbett.

BEAVERS, J. C. Assistant, Farm Management Investigations. Engaged in the study of farm practice with reference to the maintenance of soil fertility. Work is being conducted generally throughout the United States, consisting of the study of farm practice in the use of manures and fertilizers; the time, kind, and quantity of fertilizer to apply; methods of preserving and applying manures; and crops adapted for green manuring in different sections. The objects are to learn the most practicable methods of handling manures; the quantity of manure required to



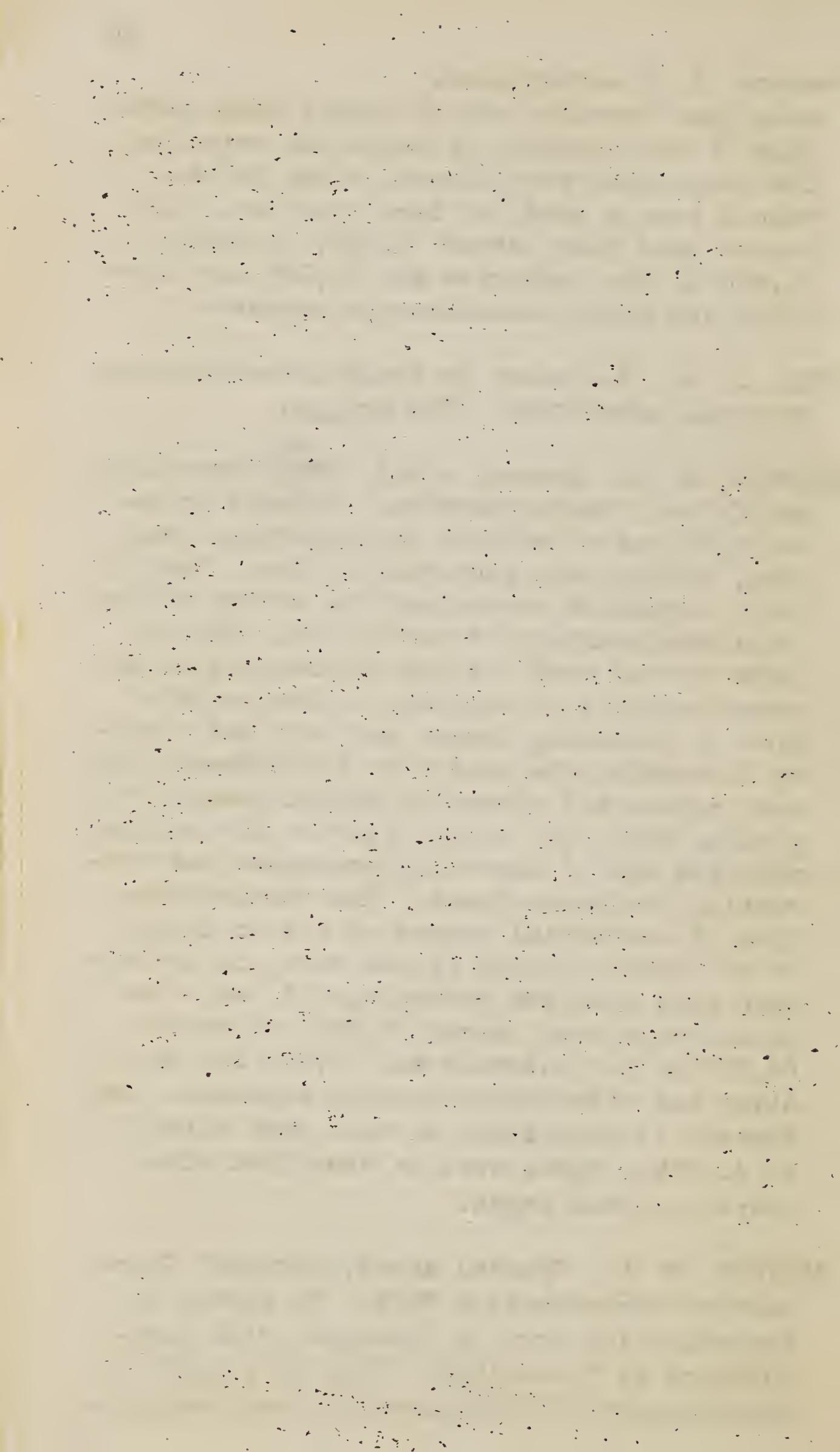
Beavers, J. C.--Continued.

keep land fertile; and to secure such knowledge of the relation of soils and crops to the commercial fertilizers as can be obtained from a study of farm practice. Expenses this year, about \$3,000, of which \$1,800 is for salaries and \$1,200 for traveling and other miscellaneous expenses.

BELZ, J. O. Assistant in field investigations, Physical Laboratory. See Briggs.

BENNETT, R. L. Special agent, Crop Technology and Cotton Standardization. Engaged in investigations of methods of preparing, ginning, baling, and marketing cotton. Work is being conducted throughout the cotton States, with headquarters at Paris, Tex. The objects of the work are the development of improved methods of handling cotton, with a view to lessening damage and cost and thereby increasing the profit to the farmer. The work covers all phases of cotton damage from picking until the cotton reaches the spinner, with the aim of improving processes and correcting faults as found. The standardization of commercial grades of cotton is one of the chief objects of the work, in accordance with specific provisions of law. Expenses this year, about \$7,500, of which \$4,500 is for salaries and \$3,000 for traveling and other miscellaneous expenses. Dr. Bennett is associated in this work with Dr. N. A. Cobb, whose work is described elsewhere in these pages.

BENTLEY, W. D. Special agent, Farmers' Cooperative Demonstration Work. In charge of demonstration work in Oklahoma, with headquarters at Tishomingo. This is a part of the cooperative demonstration work conducted



Bentley, W. D.--Continued.

under the direction of Dr. S. A. Knapp, the objects being the encouragement of the diversification of crops, the improvement of cultural methods and of systems of farm management in sections invaded by the cotton boll weevil or in which it would seem that the boll weevil is likely soon to appear. The main aim of the work is simply to bring to the attention of the farmer plain and practical methods of bettering his condition, improving his soil, and growing larger crops. The people are reached largely by personal contact with representatives of the Department. This general propaganda has met with great and continued success, showing the difference in actual money returns from farms handled by the old methods and from farms handled on the newer plans. Expenses this year in Oklahoma, about \$12,000, of which \$9,500 is for salaries and \$2,500 for miscellaneous field expenses. Mr. Bentley is assisted by a corps of field agents.

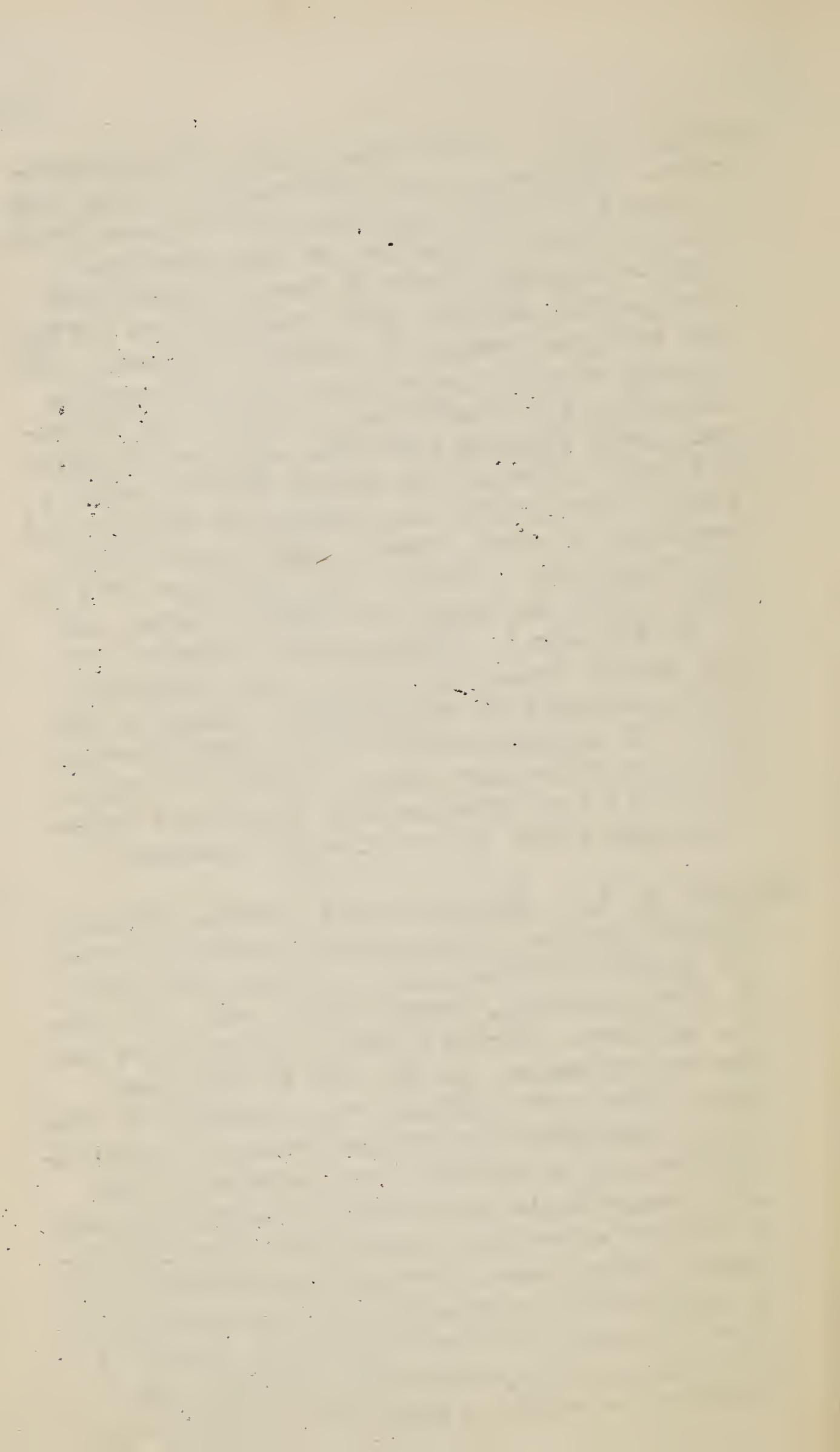
BILLINGS, G. A. Assistant, Farm Management Investigations. Engaged in the study of crop systems and methods of management on dairy farms. Work is being conducted generally throughout the United States. The objects are to determine the best cropping systems for dairy farms of different types and in different sections of the country and to ascertain the best methods of management on dairy farms. Much of this work is being carried on in Pennsylvania and New Jersey. Expenses this year, about \$4,000, of which \$2,500 is for salaries and \$1,500 for traveling and other miscellaneous expenses.

BLANCHARD, H. F. Assistant agronomist in California grain experiments. See Carleton.



BOERNER, E. G. Assistant, Grain Standardization. Engaged in the examination of cargoes of American grain arriving at European ports. Work is being conducted at the principal grain-receiving ports of Great Britain and Continental Europe, with headquarters during the shipping season at London, England. The objects are to secure definite information regarding the condition on arrival of American grain shipped from the various Atlantic and Gulf ports of the United States, with a view to improving the commercial grading and handling of corn, wheat, oats, rye, barley, and flaxseed. Much of the complaint of foreign buyers is based on damaged grain, and it is the aim to eliminate this feature of our export trade by studying and improving the conditions of handling the grain at the ports of shipment and also in ocean transit. Expenses this year, about \$4,000, of which \$2,000 is for salaries and \$2,000 for traveling and other miscellaneous expenses.

BOYKIN, E. B. Special agent, Cotton Breeding Investigations. Engaged in breeding cottons for South Carolina and in testing the value of fertilization, cover crops, etc., in cotton culture. Work is being conducted at Lamar and Columbia, S. C., and at Ittabena, Miss. The work includes the breeding of cotton to increase the productiveness of the varieties and to develop more productive Upland long-staple varieties; breeding cowpeas to secure a variety adapted for planting between cotton rows; testing the advisability of fertilizing cotton during the growing period according to the Williamson method of fertilizing corn; the value of vetch for planting in cotton fields as a winter crop;

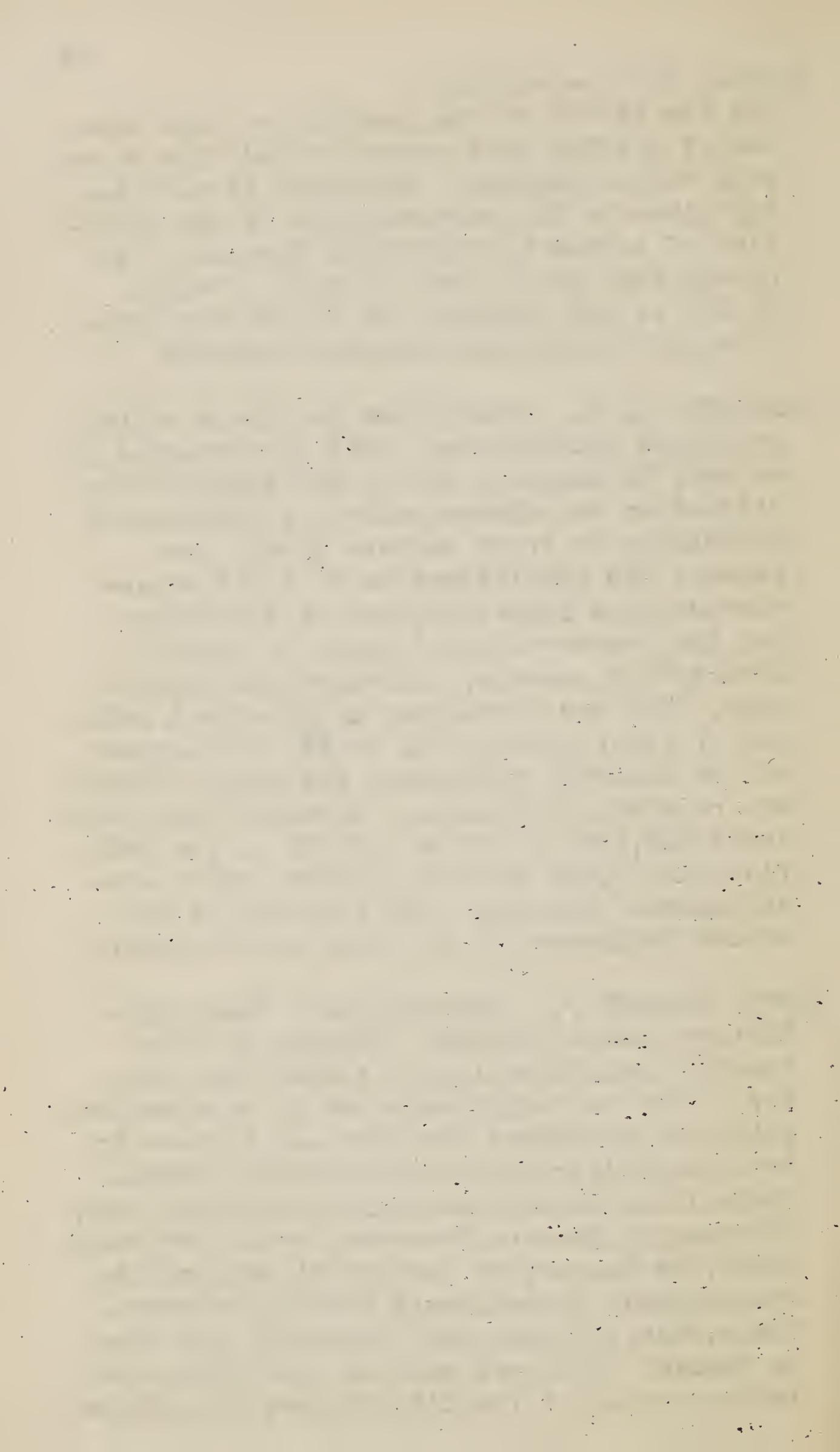


Boykin, E. B.--Continued.

and the effect on the quantity of lint cotton of holding seed cotton in bulk for a period before ginning. Attention is also being given to the encouragement of the selection of cotton by individual farmers. Expenses this year, about \$5,000, of which \$2,200 is for salaries and \$2,800 for traveling and other miscellaneous expenses.

BRACKETT, G. B. Pomologist in charge of Pomological Collections. Work is conducted in or near Washington, D. C., and includes the collection and dissemination of information pertaining to fruit culture in all its phases; the simplification of fruit nomenclature; the identification of varieties; and the preservation of types by means of description, models, paintings, and specimens. Matters pertaining to practical methods of fruit growing and to the development of the industry throughout the United States are receiving attention. Expenses this year, about \$18,000, of which 17,000 is for salaries and 1,000 for supplies and other miscellaneous expenses. Mr. Brackett is assisted by Messrs. W. H. Ragan and W. N. Irwin.

BRAND, CHARLES J. Physiologist, Plant Life History Investigations. Engaged in life history investigations of alfalfa and clover. Work is being conducted in cooperation with the experiment stations and farmers in Arizona, California, Colorado, Florida, Hawaii, Idaho, Illinois, Indiana, Kansas, Kentucky, Maine, Mississippi, Montana, Nebraska, Nevada, New Hampshire, New Mexico, New York, North Dakota, Ohio, Oregon, Rhode Island, South Dakota, Tennessee, Texas, Utah, Virginia, and Wisconsin, and also in Canada. The work has for its objects the investigation of the life history of alfalfa.



Brand, Charles J.--Continued.

and red clover, with special reference to their heat, moisture, aeration, nutrition, pollination, and cultural requirements, with a view to discovering drought-resistant varieties for the semiarid portions of the West and hardy varieties for the colder sections of the United States; and also to determine the effect of change of seed, the regions where seed production can be carried on most profitably, and from what sources farmers in various States can secure seed most likely to succeed under their conditions. Expenses this year, about \$5,000, of which \$3,500 is for salaries and \$1,500 for traveling and other miscellaneous expenses.

BREWER, JAMES F. Artist and assistant, Laboratory of Plant Pathology. See Smith, E. F.

BRIGGS, LYMAN J. Physicist in charge of Physical Laboratory. The Physical Laboratory is charged with the investigation of the physical and physiological factors which influence the growth of crops, and with the devising of instruments and methods for the quantitative measurement of such factors. Especial attention is being given to the influence of different cultivation methods on the conservation of moisture in the semiarid regions. Field work along this line is being conducted at Amarillo and Dalhart, Tex.; Hays and Garden City, Kans.; Akron, Colo.; North Platte, Nebr.; Bellefourche, S. Dak.; Edgeley and Dickinson, N. Dak.; and Moore, Mont., in cooperation with the office of Dry Land Agriculture Investigations (see Chilcott); and at Nephi, Utah, in cooperation with the office of Grain Investigations (see Jardine). Experiments to determine the influence of electricity on



Briggs, Lyman J.--Continued.

the growth of truck crops are being conducted at the Arlington Experimental Farm in co-operation with the office of Plant Life History Investigations (see Swingle); and experiments to determine the best method of checking the development of root-rot (*Thielavia*) on tobacco in the field are being carried on at Suffield, Conn., in cooperation with the office of Tobacco Investigations (see Shamel). Expenses this year, about \$16,000, of which \$9,700 is for salaries and \$6,300 for traveling and other miscellaneous expenses. Dr. Briggs is assisted by Messrs. J. O. Belz, J. W. McLane, and Miss Julia R. Pearce.

BRODIE, D. A. Assistant agriculturist, Farm Management Investigations. In general charge of work in farm management districts, of which eleven have been organized, each district including one or more States. This work consists of a study of the types of farming prevailing in each district and the general results secured from each type; the cropping systems used on farms of different types; and the adaptability of different types of farming to the particular region. Attention is also given to local conditions with reference to the amount, kind, and character of available farm labor and to market conditions; to the adaptability of crops to local conditions of soil and climate; to methods of crop and stock management; to the equipment used on farms of various types, including a study of the machinery, live stock, buildings, fences, and other requirements for successful work. Attention is also devoted to local methods of tillage; and a detailed study of the systems of management in vogue on successful farms



Brodie, D. A.--Continued.

is a leading feature of the work. A part of the work also consists in conducting object-lesson farms and demonstrations on special phases of farming in cooperation with State authorities. In the cotton States, where four of the eleven districts are located, the work has a special bearing on the boll weevil problem, the advisability of the diversification of crops being demonstrated to cotton growers. Expenses this year in supervisory phases of this work, about \$7,000, of which \$5,400 is for salaries and \$1,600 for traveling and other miscellaneous expenses. The expenses in each of the eleven districts, as well as the States embraced by each district, are mentioned opposite the names of the assistants conducting the work, namely, Messrs. Crosby, Dodge, Drake, Goodrich, Hunter, McDowell, McNair, Miller, Warren, and Youngblood.

BROWN, D. E. Special agent, Maryland tobacco investigations. See Mathewson.

BROWN, EDGAR. Botanist in charge of Seed Laboratory. Work covers the examination of seeds for the presence of adulterants, in accordance with law; making tests of seeds for farmers and others in regard to germination and mechanical purity; the preparation and distribution of authentic sets of seeds of weeds and economic plants; and propaganda work with a view to popularizing seed testing. About 25,000 samples of seeds are tested annually. Improved methods of testing and handling seeds are being worked out, and investigations of the effect of climate and other factors on the vitality of seeds are being carried on. Cooperative seed testing laboratories are maintained at Lin-



Brown, Edgar--Continued.

coln, Nebr., and Columbia, Mo., in cooperation with the State experiment stations at those points. Expenses this year, about \$25,000, of which \$20,000 is for salaries and \$5,000 for traveling and other miscellaneous expenses. Mr. Brown is assisted by Messrs. F. H. Hillman and W. L. Goss.

BROWN, ERNEST B. Assistant in corn investigations and sweet corn breeding. See Hartley.

BROWN, NELLIE A. Assistant in laboratory studies of diseases of the sugar beet and other plants. See Townsend.

BURNETT, L. C. Special agent in oat breeding, Grain Investigations. See Varburton.

BURR, W. W. Assistant in dry land agriculture investigations, North Platte, Nebr. See Chilcott.

BURRITT, M. C. Assistant, Farm Management Investigations. See Dodge.

BUTTERFIELD, EARL C. Assistant horticulturist, Arlington Experimental Farm. See Corbett.

BYRNES, E. M. Superintendent, Gardens and Grounds. Work includes the care and ornamentation of the Department grounds, maintenance of greenhouses and trial grounds for experimental purposes, and the propagation and handling of plants for Congressional and special distribution. Facilities for horticultural work are provided for the various offices of the Bureau, a complete range of greenhouses being maintained. Experimental



Byrnes, E. M.--Continued.

work with carnations and other florists' crops and with vegetables is being conducted. Expenses this year, including care of Department grounds, about \$40,000, of which \$30,000 is for salaries of gardeners, mechanics, etc., and \$10,000 for the miscellaneous expenses of maintenance.

CAMPBELL, J. P. Special agent, Farmers' Co-operative Demonstration Work. See Knapp.

CARLETON, M. A. Cerealist in charge of Grain Investigations. Personally engaged in the establishment of the durum wheat, emmer, proso, and other new grain industries; the improvement of wheat, winter grains, oats, and other cereal crops; and experiments in crop rotation, the influence of climate and soil on the quality of grains, and in methods of cultivating and harvesting. This work is being conducted at Fargo, N. Dak.; Brookings, S. Dak.; McPherson, Kans.; Lincoln, Nebr.; Madison, Wis.; St. Paul, Minn.; Ames, Iowa; College Park, Md.; Knoxville, Tenn.; and at Ceres and Davisville, Cal. Close cooperation with the State experiment stations is in effect. The objects of the work are the production of pure types of durum and other wheats, improved oat varieties, and to determine the effect of growing leguminous crops in rotation with cereals. The establishment of emmer as a crop for stock feeding and of proso and other grain millets is also a part of the work. Expenses this year in these lines of work, about \$13,000, of which \$10,500 is for salaries and \$2,500 for traveling and other miscellaneous expenses. Mr. Carleton is assisted by Messrs. H. F. Blanchard, H. J. C. Umberger, and V. L. Cory.



CARLETON, H. A.--Continued.

The investigations of Messrs. Ball, Derr, Jardine, Johnson, Ross, and Warburton, described elsewhere in these pages, are directed by Mr. Carleton.

CARROLL, W. P. Assistant, Grain Standardization. In charge of grain standardization laboratory, Chicago, Ill. The work at this, as well as at all the other field laboratories, consists in the examination of samples of commercial grain passing through the local markets, in order to determine the percentage of moisture, dirt, shriveled grain, sound grain, damaged grain, etc. The object is to obtain information and data which will enable the Department of Agriculture to establish uniform standard grades for all classes of commercial grain--corn, wheat, oats, rye, barley, flaxseed, etc. The laboratory was established at Chicago for the reason that it is the largest primary grain market in the world and affords especially good facilities for studying questions in connection with the grain business generally. The work at this laboratory has the support of the Chicago Board of Trade. Expenses this year, about \$8,000, of which \$5,000 is for salaries and \$3,000 for traveling and other miscellaneous expenses of maintenance.

CATES, J. S. Assistant, Farm Management Investigations. Engaged in studies of farm practice with reference to tillage and to the eradication of weeds. Work is being conducted generally throughout the United States, and demonstrations in the eradication of Johnson grass are being carried on in the South. Methods of exterminating charlock, nut grass, quack grass, wild on-

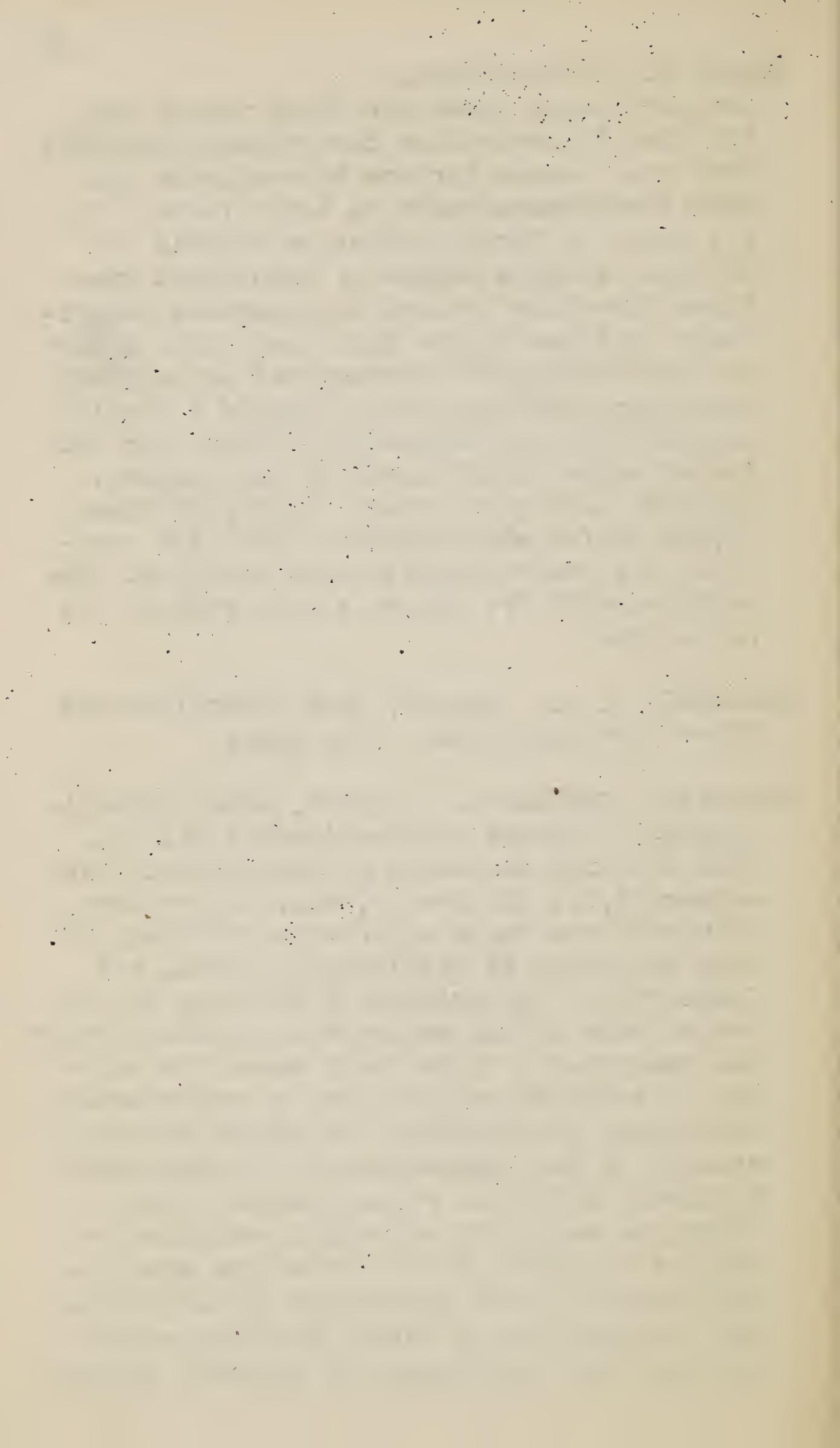


Cates, J. S. ....Continued.

ion, and other weeds are being worked out, in order to secure and disseminate knowledge that will enable farmers to eradicate the most troublesome weeds on their farms. In the study of farm practice in methods of tillage, a large number of experiment stations have been induced to undertake experiments outlined by the Department with a view to ascertaining the fundamental principles underlying tillage, and to obtain a knowledge of the best methods of tillage for different crops in all parts of the country. Expenses this year, about \$7,500, of which \$4,500 is for salaries and \$3,000 for traveling and other miscellaneous expenses. Associated with Mr. Cates in this work is Mr. H. F. Cox.

CHAMBERS, W. E. Expert, Crop Technology and Fiber Investigations. See Cobb.

CHAMBLISS, CHARLES E. Expert, Grain Investigations. Engaged in rice investigations. Work is being conducted at Crowley, La.; Jacksonboro, S.C.; and Lonoke, Ark., in cooperation with the State experiment stations; and also at points in Mississippi, Texas, and California. The objects of the work are to secure data on the comparative yielding power and qualities of rice grown under the methods of cultivation practiced in southwestern Louisiana; to determine the effect of environment on the composition of Carolina Gold, Honduras, and Japan rices planted in the South; to secure by selection varieties resistant to blast; and to determine the possibilities of rice production in California. The introduction of better yielding varieties and the improvement of cultural methods



Chambliss, Charles E.--Continued.

for rice are also objects sought. Expenses this year, about \$2,500, of which \$2,000 is for salaries and \$500 for traveling and other miscellaneous expenses.

CHARLES, VERA K. Assistant, Pathological Collections. See Patterson.

CHASE, AGNES. Assistant in systematic agrostology. See Hitchcock.

CHILCOTT, E. C. Agriculturist in charge of Dry Land Agriculture Investigations. Work is being conducted in the Great Plains Area, bounded by the 98th meridian on the east and the 5,000-foot contour line east of the Rocky Mountains on the west, and by the 32d and 49th parallels, covering about 330,000 square miles. The work is located at Williston, Dickinson, and Edgeley, N.Dak.; Belle-fourche, S.Dak.; North Platte, Nebr.; Hays and Garden City, Kans.; Akron, Colo.; Amarillo and Dalhart, Tex.; and at Utica, Mont. Close co-operation with the State experiment stations of Montana, North Dakota, Nebraska, Kansas, and Colorado is in effect. The objects of the work are to determine the best methods of crop rotation, the most suitable crops, and the cultural methods best suited for the conservation of moisture and humus, with a view to the betterment of agricultural conditions and practices in the Great Plains Area. The chief crops under experiment are cereals, grasses and forage plants, peas, potatoes, etc. Expenses this year, about \$33,000, of which \$20,000 is for salaries and \$13,000 for traveling and other miscellaneous expenses. Prof. Chilcott is assisted by Messrs. John S. Cole, C. A. Jensen, J. M. Stephens, F. L. Kennard, J. E. Payne,



Chilcott, E. C.--Continued.

and W. W. Burr. Messrs. C. S. Scofield, L. J. Briggs, T. H. Kearney, W. M. Jardine, and Karl F. Kellerman, whose work is described elsewhere in these pages, are each engaged upon special problems in cooperation with Prof. Chilcott.

CHISOLM, FREDERIC F. Expert, Foreign Seed and Plant Introduction. See Fairchild.

CLARKE, FRED W. Assistant in matting plant investigations, Foreign Seed and Plant Introduction. See Fairchild.

COBB, N. A. Crop technologist in charge of Crop Technology and Fiber Investigations. Personally engaged in laboratory studies of the biology of grain breeding and milling; the development of improved apparatus and methods of standardizing grain and cotton, improved machinery for the work in dry land agriculture, and the improvement of technological methods in other lines of investigation carried on by the Bureau. In cooperation with the Forest Service, tests of various plants as to their suitability for conversion into paper are being made. Trials of possible new sources for fabrics and papers are being conducted. Expenses this year in these phases of the work, about \$7,500, of which \$6,000 is for salaries and \$1,500 for traveling and other miscellaneous expenses. Dr. Cobb is assisted by Mr. W. E. Chambers. The investigations of Messrs. Bennett and Dewey, described elsewhere in these pages, are conducted in close association with those of Dr. Cobb.



COCKE, R. P. Special agent, Virginia tobacco investigations. See Mathewson.

COLE, JOHN S. Expert and field assistant, Dry Land Agriculture Investigations. See Chilcott.

COLLINS, G. N. Assistant botanist, Bionomic Investigations of Tropical and Subtropical Plants. See Cook.

CONNER, A. B. Assistant, Forage Crop Investigations. See Piper.

COOK, O. F. Bionomist in charge of Investigations of Tropical and Subtropical Plants. Chief attention is being devoted to cotton and corn, field experiments with these crops being under way at Brownsville, Del Rio, Falfurrias, Kerrville, Moore, San Angelo, San Antonio, and Victoria, Tex.; Yuma, Ariz.; Fallon, Nev.; Chico and Los Angeles, Cal.; Winfield and Stockton, Kans.; and Lanham, Md. The objects of the work are to determine and apply the general physiological factors which control the growth of the principal crop plants which originated in tropical countries. Improved methods of acclimatization and breeding are being developed, to facilitate the introduction of varieties adapted to special purposes and conditions. Central American varieties of cotton resistant to the boll weevil are being acclimatized in the South, as well as drought-resistant varieties, in order to extend cotton culture into the drier regions where the weevils are less injurious. Experiments are being made with Central and South American varieties of corn adapted to special conditions of moisture, drought, and irrigation, to acclimatize them



Cook, O. F.--Continued.

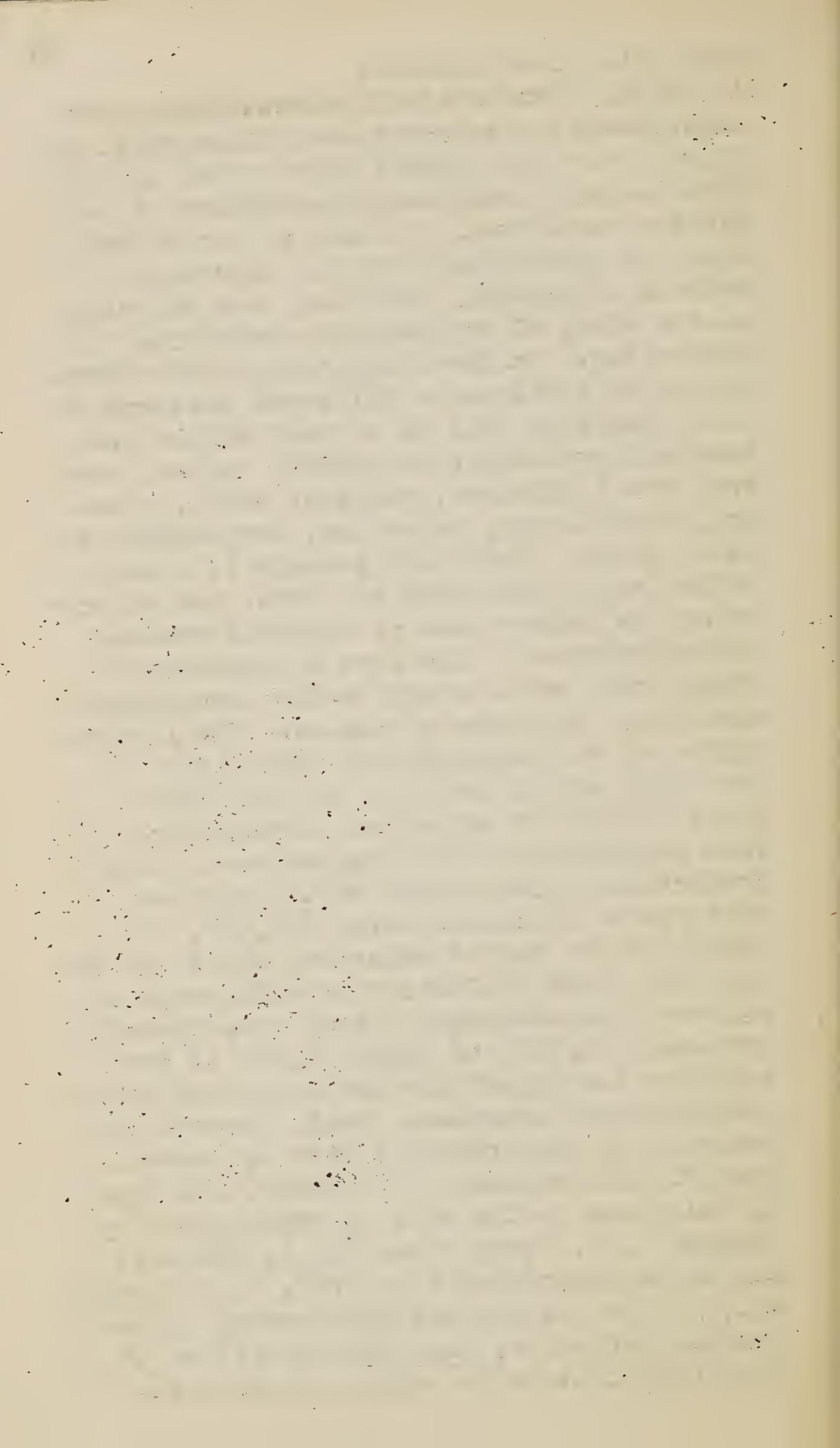
in parts of the South and West where our present varieties do not thrive. Tropical crops receiving incidental attention in the work are rubber and rubber substitutes, cacao, coffee, the mango, avocado, banana, chayote, etc. Expenses this year, about \$20,000, of which \$16,000 is for salaries and \$4,000 for traveling and other miscellaneous expenses. Mr. Cook is assisted by Messrs. G. N. Collins, H. Pittier, F. L. Lewton, J. H. Kinsler, C. B. Doyle, Argyle McLachlan, and R. M. Meade.

CORBETT, L. C. Horticulturist in charge of Arlington (Virginia) Experimental Farm and Truck Crop Investigations. Work at Arlington Farm includes the general supervision and improvement of the farm; maintenance of a model fruit garden and kitchen garden; tests of vegetables and flowers; a study of the influence of heat, light, and moisture on greenhouse crops; a quantitative investigation of the transpiration of economic plants; the maintenance of variety orchards of the apple and peach; and a collection of hardy herbaceous and woody plants. Truck crop investigations contemplate a comprehensive truck crop survey of the United States. At present the work is chiefly confined to the Eastern States, especially those bordering the Atlantic coast--Vermont, New York, New Jersey, Virginia, North Carolina, South Carolina, and Georgia; and also in Kentucky, Ohio, Alabama, Tennessee, Texas, Indiana, Michigan, Colorado, and California. The principal work is located at Mattituck, Long Island, N.Y.; Meggett, S.C.; Suffolk, Va.; and at the Virginia Truck Experiment Station, near Norfolk, which is maintained in cooperation with the Virginia Agricultural Experiment Station. The work



Corbett, L. C.--Continued.

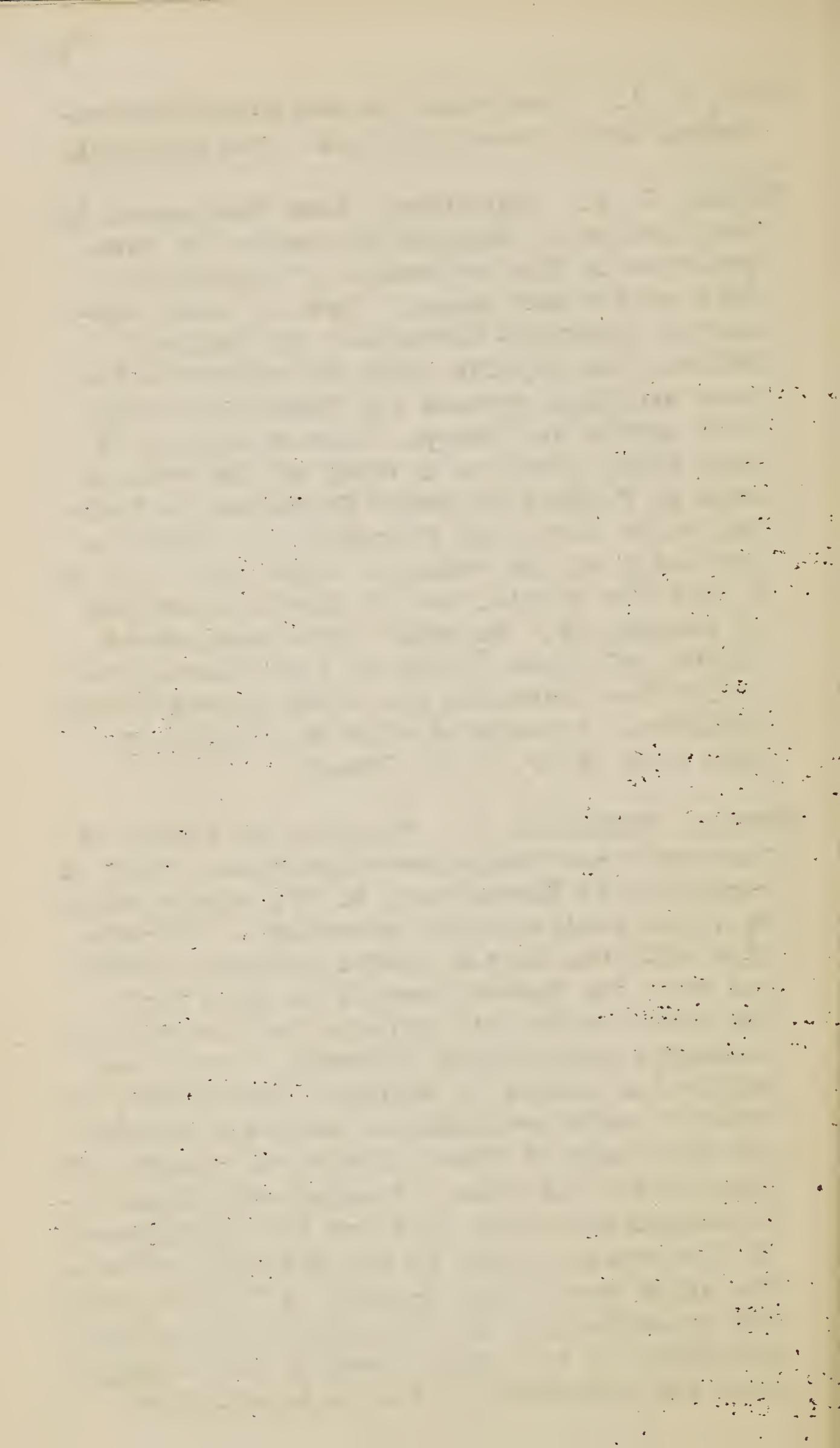
is in the form of field demonstrations and experiments in cooperation with growers. The objects are the general improvement of cultural methods and the dissemination of desirable varieties. A study of market conditions is being made, for the improvement of methods of packing, handling, and shipping; also a study of cooperative production and harvesting. An investigation of the adaptability of potatoes to different sections is being made; as well as a study of the culture and production of melons, onions, celery, sweet potatoes, cabbage, beets, spinach, cauliflower, asparagus, horseradish, and water cress. Work with peanuts is being conducted in the South and West, the objects being the improvement of cultural methods; demonstrations of the uses of peanuts as stock food; and a study of the harvesting, marketing, and uses of peanuts. An investigation of the influence of fertilizers on the yield and maturity of various truck crops and of the effect of certain truck farm practices on the maintenance of crop production is also under way. Expenses this year: Arlington Farm, \$25,000, of which \$20,000 is for salaries, hiring of labor, etc., and \$5,000 for miscellaneous expenses of maintenance. Truck Crop Investigations, \$11,000, of which \$8,500 is for salaries and \$2,500 for traveling and other miscellaneous expenses. Prof. Corbett is assisted on the Arlington Farm by Messrs. Earl C. Butterfield, W. V. Shear, and John H. Tull; and in the work on truck crops by Messrs. W. R. Beattie and Guy L. Stewart; and he is associated with Prof. W. W. Tracy, Sr., in the testing and improvement of vegetable varieties; and with the office of Seed Distribution in school garden work.



CORY, V. L. Assistant in adaptation experiments, Grain Investigations. See Carleton.

COTTON, J. S. Assistant, Farm Management Investigations. Engaged in studies of farm practice in the production of forage for beef cattle and sheep. Work is being conducted generally throughout the United States, the objects being to ascertain the best cropping systems for farms producing beef cattle and sheep. Some attention is also being given to a study of the methods used by feeders at sugar factories in feeding sugar beet pulp to cattle, to obtain a knowledge of the value of sugar beet pulp as a feed for cattle, and of the best methods of feeding it. Expenses this year, about \$6,500, of which \$3,500 is for salaries and \$3,000 for traveling and other miscellaneous expenses. Associated with Mr. Cotton in this work is Mr. D. H. Doane.

COVILLE, FREDERICK V. Botanist in charge of Taxonomic and Range Investigations. Work is conducted in Washington, D. C., supplemented by field studies where necessary. Cooperation with the United States National Museum and with the Forest Service is in effect. The work has for its objects the securing of authentic information regarding native and cultivated plants of economic importance, in order to make available an accurate botanical knowledge of those plants and records of their value and uses. Special additional investigations this year are the improvement of the grazing lands in the National Forests, the chief work being located at Wallowa, Oreg.; the domestication of the native blueberries; the study of the plants used by the aborigines; the preparation of an authoritative



Coville, Frederick V.--Continued.

manual of the flora of Alaska; and also of a catalogue of the botanical literature in the various Government libraries in Washington. Expenses this year in these lines of work, about \$9,800, of which \$8,800 is for salaries and \$1,000 for traveling and other miscellaneous expenses. The investigations of Messrs. Hitchcock, Safford, and Wight, described elsewhere in these pages, are directed by Mr. Coville.

COX, H. R. Assistant in weed and tillage studies, Farm Management Investigations. See Cates.

CRON, A. B. Assistant in laboratory investigations, Grain Standardization. See Duvel.

CROSBY, M. A. Assistant agriculturist, Farm Management Investigations. In charge of work in District No. 2, embracing Alabama, Mississippi, and Tennessee. (See Brodie.) The chief work in this district is being conducted at Huntsville, Talladega, and Uniontown, Ala.; Macon, Ridgeland, and Wiggins, Miss.; and Darks Mills and Whiteville, Tenn. Diversification farms are conducted as object lessons at these and other points throughout the district; and the work also includes a study of the methods of growing and handling various coarse legumes throughout the Southern and Northern States and a study of crops adapted for use as winter cover crops in the South. Corn, cotton, alfalfa, peas, vetches, clover, and various truck crops are under investigation. The work in this district is conducted with special reference to the boll weevil problem. Expenses this year, about \$3,000, of which \$2,000 is for salaries and \$1,000 for traveling and other miscellaneous expenses.



DENNIS, S. J., Expert in technical fruit refrigeration and transportation problems, Field Investigations in Pomology. See Powell.

DERR, H. B. Agronomist, Grain Investigations. Engaged in barley investigations. Work is being conducted at Fargo, N. Dak.; Brookings, S. Dak.; McPherson, Kans.; Madison, Wis.; St. Paul, Minn.; College Park, Md.; and Knoxville, Tenn., in cooperation with the State experiment stations; and also in Montana, Wyoming, Nebraska, Colorado, Oklahoma, Texas, Missouri, Virginia, Iowa, Illinois, and Indiana. The objects of the work are the improvement of our present barleys in yield, quality, etc.; to establish hardy winter types; to produce pure types; and to introduce and improve the beardless and hull-less barleys. Expenses this year, about \$2,600, of which \$1,600 is for salaries and \$1,000 for traveling and other miscellaneous expenses.

DEWEY, LYSER H. Botanist in charge of Fiber Investigations. Work is being conducted at Hanover, Pa.; Mendota and Waupun, Wis.; St. Paul, Minn.; Lincoln, Nebr.; Lexington, Ky.; Brownsville, Tex.; San Diego, Courtland, and Los Angeles, Cal.; Mayaguez and Yauco, Porto Rico; and Honolulu and Sisal, Hawaii. Co-operation with the experiment stations of Wisconsin, Minnesota, Porto Rico, and Hawaii is in effect. The objects of the work are the introduction of a new hemp-growing industry in Pennsylvania and Wisconsin; the improvement of hemp varieties, including trials of Manchurian hemp; the production of ramie fiber in California; and the introduction of sisal, henequen, and other hard fiber producing plants into Porto Rico and Hawaii. Trials of sisal, henequen, zapupe, and other



DeweY, Lyster H.--Continued.

fiber plants are also being made in Texas and California. Some attention is also being given to flax, jute, phormium, and other plant fibers. Improved methods of handling fiber crops are being worked out. Expenses this year, about \$6,500, of which \$4,500 is for salaries and \$2,000 for traveling and other miscellaneous expenses.

DILLMAN, A. C. Expert in dry land plant breeding. See Kearney.

DOANE, D. H. Special agent in studies of forage for beef, hogs, and sheep, Farm Management Investigations. See Cotton.

DODGE, L. G. Assistant agriculturist, Farm Management Investigations. In charge of work in District No. 5, embracing New York and the New England States. (See Brodie.) The work in this district covers farm practice on dairy, truck, fruit, beef, and hog farms. A study is also being made of farm practice in potato culture and of the use of potatoes as a field crop. The cropping systems on the most successful farms in the district are being closely studied. Expenses this year, about \$4,000, of which \$2,400 is for salaries and \$1,600 for traveling and other miscellaneous expenses. Mr. Dodge is assisted by Mr. M. C. Burritt.

DOYLE, C. B. Expert in cotton experiments, Bionomic Investigations. See Cook.

DRAKE, J. A. Assistant agriculturist, Farm Management Investigations. In charge of work in District No. 9, embracing Illinois, Indiana, Ohio, Kentucky, and West Virginia. (See Brodie.) The work in this district is



Drake, J. A.--Continued.

essentially similar to that in the other farm management districts. Expenses this year, about \$2,600, of which \$1,600 is for salaries and \$1,000 for traveling and other miscellaneous expenses.

DUVAL, LAUREL. Assistant, Grain Standardization. In charge of grain standardization laboratory, Baltimore, Md. The work at this laboratory is similar to that at the Chicago laboratory, previously described (see Carroll). The laboratory was established at Baltimore for the reason that it is a semi-southern export market through which large quantities of corn are annually exported, thus affording excellent facilities for studying the effects of climatic conditions upon grain passing through this market at different seasons of the year. Expenses this year, about \$4,500, of which \$3,000 is for salaries and \$1,500 for traveling and other miscellaneous expenses of maintenance.

DUVEL, J. W. T. Assistant in charge of laboratory methods, Grain Standardization. Engaged in laboratory investigations of the commercial grading of grain. Work includes general investigations and research bearing upon the grading, storing, shipping, and carrying quality of grains in the United States, both as regards interstate transportation and handling at points of export; ascertaining the causes of deterioration of grain in storage and transit, with a view to improving the methods of grain inspection and grading, and effecting an equitable and scientific method of grading grains. Demonstrations of the practicability of these methods are being made in the different markets and points of export in the United



Duvel, J. W. T.--Continued.

States, with the result that they are being generally adopted by most of the large grain inspection departments and grain dealers throughout the country. Expenses this year, about \$12,500, of which \$7,500 is for salaries and \$5,000 for equipment, necessary travel, and other miscellaneous expenses. Dr. Duvel is assisted by Mr. A. B. Cron.

ELLIS, L. W. Assistant, Farm Management Investigations. Engaged in studies of farm equipment, buildings, fences, etc. Work is being conducted generally throughout the United States, consisting of a study of the equipment in buildings, fences, implements, machinery, and live stock on a large number of farms, in order to secure a knowledge of the equipment necessary for maximum profit on farms of different types. A study of the space required in farm buildings per unit of animal crop product is being made, with a view to securing data that will permit the planning of farm buildings on a scientific basis. The cost and adaptability of different types of farm fences, of small tools and sundries, and of equipment used in handling manure, are also being studied. Expenses this year, about \$2,500, of which \$1,400 is for salaries and \$1,100 for traveling and other miscellaneous expenses.

EVANS, JAMES A. Special agent, Farmers' Co-operative Demonstration Work. In charge of demonstration work in Louisiana and Arkansas, with headquarters at Shreveport, La. This is a part of the cooperative demonstration work conducted under the direction of Dr. S. A. Knapp and is similar to that conducted in Oklahoma (see Bentley). Expenses this year, about \$30,000, of which \$22,000



Evans, James A.--Continued.

is for salaries and \$8,000 for traveling and other miscellaneous expenses. Mr. Evans is assisted by a corps of field agents.

EVANS, M. W. Assistant, Forage Crop Investigations, Pullman, Wash. See Piper.

FAIRCHILD, DAVID. Agricultural explorer in charge of Foreign Seed and Plant Introduction. Work is conducted through agricultural explorers sent to foreign countries in search of rare and valuable seeds and plants suitable for cultivation in various parts of the United States. Numerous introductions are being tested throughout the country in cooperation with the State experiment stations and with more than 20,000 correspondents, including Alaska, Puerto Rico, Hawaii, the Philippine Islands, and the Canal Zone. In addition to this pioneer work of testing new industries on a small scale to determine their value, special cooperative investigations are being carried on with other offices of the Bureau, as follows: On Phylloxera resistant grapes and newly introduced table grapes, at Chico and other points in California (see Husmann); on date introductions and special date gardens at Mecca and Indio, Cal., and on the pistache (see Swingle); on Mexican peach varieties in Texas (see Scofield); on mangos, avocados, and anonas at Miami, Fla. (see Wester); and on newly introduced grains (see Carleton). Other plants under experiment with a view to their introduction are yautias, the new root crops for the wet lands of the South, especially South Carolina and Florida; bamboos for the cheap lands of Alabama and Louisiana; Japanese, Chinese, and other matting plants



Fairchild, David--Continued.

for the manufacture of floor mattings, matting lath, etc., tests of these plants being under way at Pierce, Tex.; Crowley, La.; Jacksonboro, S.C.; and in Georgia, California, and Florida; European globe artichokes and West Indian chayotes for the truck regions of the South, chiefly in South Carolina, Louisiana, and Mississippi; cork oaks for the poor lands of the Carolinas and Georgia; and European hops for the Pacific Coast and New York hop areas. All of this work is closely related to and forms a large part of that of the Plant Introduction Garden at Chico, Cal. (see W. W. Tracy, Jr.). A plant introduction garden is also maintained at Ames, Iowa, in cooperation with the Iowa Experiment Station. Expenses this year in these phases of the work, about \$20,000, of which \$12,000 is for salaries and \$8,000 for traveling and other miscellaneous expenses, including the purchase and importation of rare seeds and plants. Mr. Fairchild is assisted by Messrs. Walter Fischer, R. A. Young, Fred W. Clarke, and Frederic F. Chisclm. The investigations of Messrs. Hills, Mann, and Meyer, described elsewhere in these pages, are directed by Mr. Fairchild; and the Siberian explorations of Prof. N. E. Hansen, described later, are also a part of the work.

FARRELL, F. D. Assistant in dry-land cereal experiments, Grain Investigations, Nephi, Utah. See Jardine.

FAWCETT, EDNA H. Assistant in soil bacteriology. See Kellerman.

FISCHER, WALTER. Assistant, Foreign Seed and Plant Introduction. See Fairchild.



FITZ, L. A. Assistant, Grain Standardization.

In charge of cooperative wheat milling and baking tests at the North Dakota Agricultural Experiment Station, Agricultural College, N. Dak. This work consists of investigations to determine the relative flour and bread values of the different classes and varieties of wheat grown in the United States in so far as relates to their commercial grades. The object is to obtain information which will greatly aid in fixing just, uniform, and intelligent grades for wheats. Expenses this year, about \$2,600, of which \$1,800 is for salaries and \$800 for miscellaneous expenses. Mr. Fitz is assisted by Mr. Clyde H. Bailey.

FLETCHER, W. F. Assistant in fruit district investigations. See Gould.

FOUBERT, C. L. Chemist aid in laboratory investigations on tobacco. See Garner.

FREAR, DANA W. Special agent in malting barley investigations. See Mann.

FROLEY, J. W. Assistant, Farm Management Investigations. Engaged in the study of farm practice in poultry management, in addition to executive duties in the Office of Farm Management Investigations. Work on poultry is being conducted generally throughout the United States, the object being to obtain knowledge of the best methods of managing poultry. Farms on which poultry is made to form an important part of the farm income are visited and the methods observed in rearing, feeding, and the general management of poultry and in the marketing of poultry and poultry products. The chief aim is to secure sufficient knowledge of the best poultry



Froley, J. W.--Continued.

practices to include poultry in the general farm plans prepared by the Office of Farm Management Investigations. Expenses this year, about \$3,000, of which \$2,400 is for salaries and \$600 for traveling and other miscellaneous expenses,

GARNER, W. W. Assistant, Tobacco Investigations. Engaged in chemico-physiological tobacco investigations. Work is being conducted in the laboratory at Washington, D.C., and also at Suffield and Tariffville, Conn.; Hinsen and Tallahassee, Fla.; Palestine, Tex.; and Germantown, Ohio, at the latter point in cooperation with the Ohio Experiment Station. In the laboratory the work pertains to the relation of the composition of tobacco to its important qualities, such as elasticity, burn, and nicotine content. The field work includes experiments in improved methods of curing tobacco; the breeding of varieties for high and low nicotine content; tests of the effects of shade on the composition and properties of tobacco; and tests of the influence of fertilizers on the quality of tobacco. Improved methods of testing the burn and determining the nicotine content of tobacco have been developed and put to practical use. Expenses this year, about \$5,000, of which \$3,500 is for salaries and \$1,500 for traveling and other miscellaneous expenses. Dr. Garner is assisted by Mr. C. L. Foubert.

GILBERT, W. W. Assistant in cotton and truck crop disease investigations. See Orton.

GOLL, F. L. Assistant in legume bacteria experiments. See Kellerman.

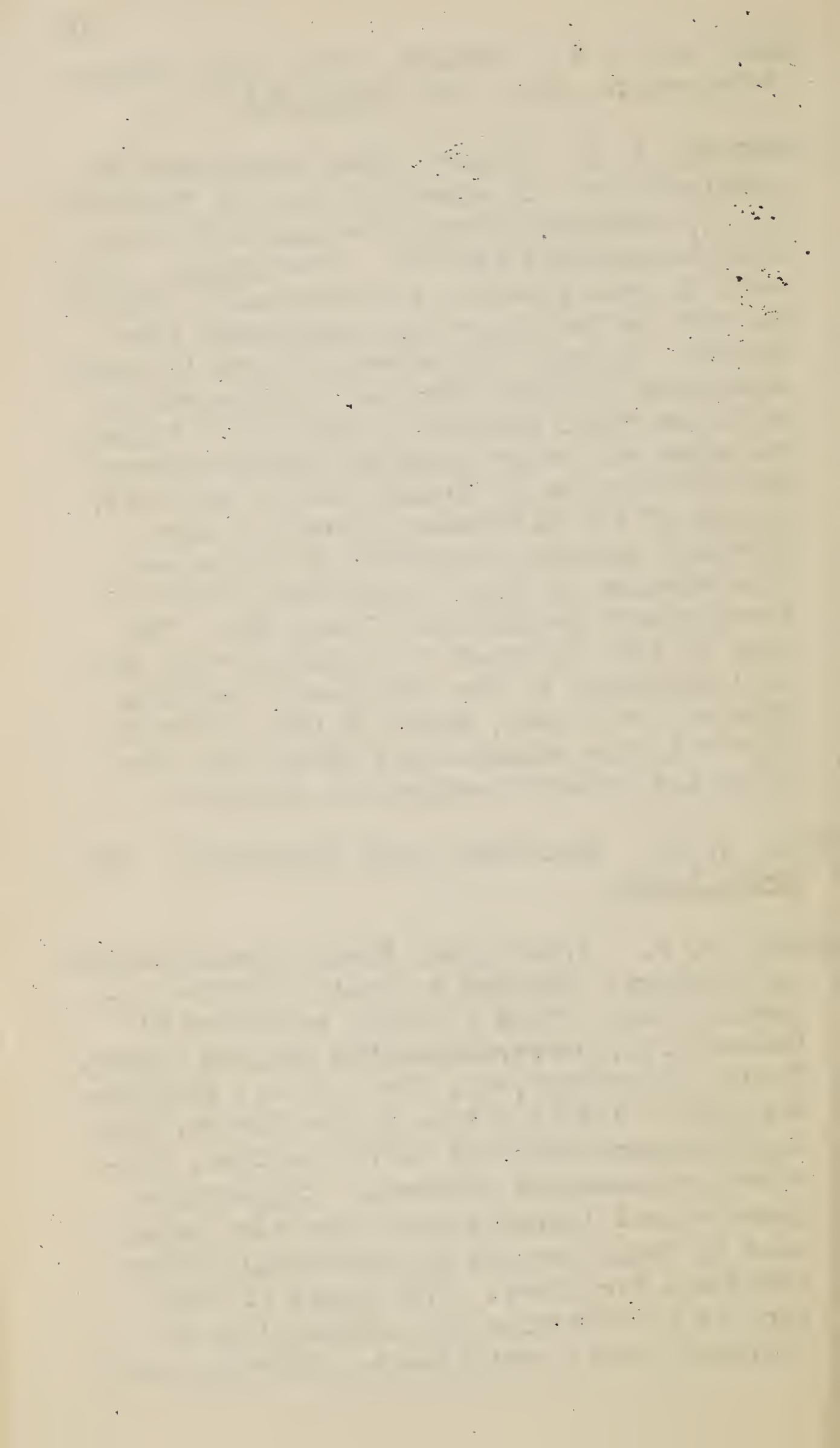


GOMME, WM. H. F. Expert, South Texas Garden, Brownsville, Tex. See Green, E. C.

GOODRICH, C. L. Expert, Farm Management Investigations. In charge of work in District No. 1, embracing North Carolina, South Carolina, Georgia, and Florida. (See Brodie.) The work in this district is essentially similar to that in the other farm management districts. Special demonstration work is being conducted in South Carolina in cooperation with about 100 farmers in the use of legumes as catch and cover crops and green manures; the inoculation of legumes new to the soil; a test of the Williamson method of corn growing; breeding varieties of cotton and corn adapted to local conditions; tests of fertilizers; production of hay; etc. The work in this district is conducted with special reference to the boll weevil problem. Expenses this year, about \$5,000, of which \$3,000 is for salaries and \$2,000 for traveling and other miscellaneous expenses.

GOSS, W. L. Assistant, Seed Laboratory. See Brown, Edgar.

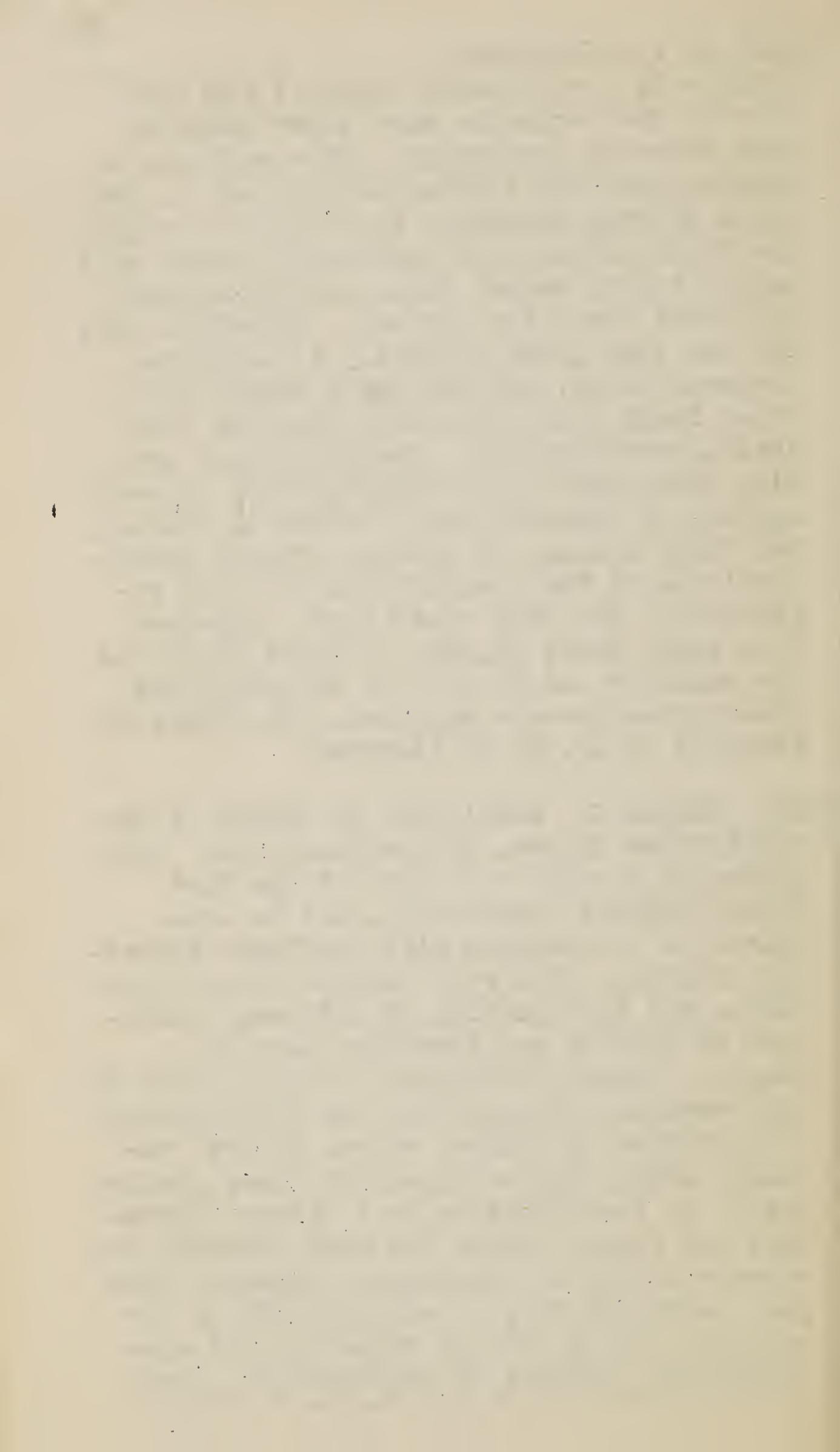
GOULD, H. P. Pomologist, Field Investigations in Pomology. Engaged in fruit district investigations. Work is being conducted at Geneva, N.Y.; Gerrardstown, Paw Paw, and Keyser, W.Va.; Experiment, Ga.; Akron, Colo.; Hutchinson, Kans.; and at points in New Jersey, Maryland, Delaware, Virginia, North Carolina, Missouri, Arkansas, and Oklahoma. Cooperative phenological investigations are also being made by fruit growers in practically every State and Territory. The object of this work is to determine the adaptability of different fruit varieties to different con-



Gould, H. P.--Continued.

ditions by a systematic study of the behavior of the varieties when grown under a wide range of conditions. This work has a bearing upon the further development of the fruit growing industry, as it aims to supply the fruit grower with information which will enable him to select those varieties which will best serve his purpose. Attention thus far has been given primarily to deciduous orchard fruits, but the small fruits and other fruit crops have also received incidental consideration. Investigations are also being made of the adaptability of early apples; of methods used on farms in canning and cider making; of western orchard management; and of the adaptability of fruit varieties to dry land conditions. Expenses this year, about \$5,500, of which \$4,000 is for salaries and \$1,500 for traveling and other miscellaneous expenses. Mr. Gould is assisted by Mr. W. F. Fletcher.

GREEN, EDWARD C. Pomologist in charge of the South Texas Garden, Brownsville, Tex. This garden is located on a part of the Fort Brown Military Reservation, and is maintained in cooperation with the Texas Experiment Station. The work includes the propagation and distribution of different varieties of foreign and domestic seeds and plants. Special attention is being given to the breeding, propagation, and distribution of varieties of grapes, citrus fruits, bananas, dates, Smyrna figs, and fiber plants; and to an investigation as to which vegetables and forage plants are most suitable for extreme southern conditions. Expenses this year, about \$9,000, of which \$6,000 is for salaries and \$3,000 for traveling and miscellaneous expenses of maintenance. Prof. Green is assisted by Mr. Wm. H. F. Gomme.



GREEN, W. W. Crop technologist, Virginia tobacco investigations. See Mathewson.

GRIFFITHS, DAVID. Assistant agriculturist, Farm Management Investigations. Engaged in range management and cactus investigations. Work on range management is being conducted chiefly on the Santa Rita National Forest, Tucson, Ariz.; but also in various portions of the Dakotas, Idaho, Montana, Washington, Oregon, Nevada, Utah, California, Colorado, New Mexico, Nebraska, and Kansas. The work in Arizona, Washington, and New Mexico is conducted in cooperation with the experiment stations. The object of the work is to ascertain the best range practices with a view to the improvement of native pastures by reseeding and to study native pasture feeds in general. Cactus investigations are being conducted at San Antonio and Brownsville, Tex.; Agricultural College, N. Mex.; Tucson, Ariz.; Chico and Riverside, Cal.; and Gainesville, Fla., in co-operation with the experiment stations and with private individuals. The work has for its objects the testing of native and introduced species of cactus plants, the study of the growth, chemical composition, and nutritive value of the plant and fruit as food for both man and beast, and the improvement of species in relation to objectionable characteristics and hardiness by breeding and selection, methods of feeding, harvesting, cultivating, etc. Expenses this year in these lines of work, about \$6,500, of which \$5,000 is for salaries and \$1,500 for traveling and other miscellaneous expenses.



HANSEN, N. E. Agricultural explorer, Foreign Seed and Plant Introduction. Engaged in agricultural explorations in northern Siberia, in search of hardy forage plants and fruits which will stand the severe climate of the northwestern United States. This is the third expedition to this region, where valuable new alfalfas which will live through extreme cold have already been found. One of these has already proved itself of great value for the Northwest, and others are now under trial. As the climate of Siberia is even more severe than that of the Northwest, and as the new seeds and plants already secured have proved unusually hardy, the opportunities for finding valuable seeds and plants in that region are very great. Expenses this year, about \$15,000, including salary, the purchase and importation of seeds and plants, and traveling and other miscellaneous expenses incident to the explorations.

HARRIS, GEORGE W. Crop technologist, Tobacco Investigations. Engaged in tobacco investigations in New York. Work is being conducted at Baldwinsville, in Onondaga County, having for its objects the improvement of types by breeding and the introduction of new types; the introduction of bulk fermentation of tobacco; and experiments with Russian hairy vetch as a cover crop for tobacco fields. The tobacco grown in New York is the same as that grown in the Connecticut Valley, and the improved types developed by breeding and selection in Connecticut are being introduced into New York. Improvements in cultural methods and in the use of fertilizers are also being worked out. Expenses this year, about \$2,500, of which

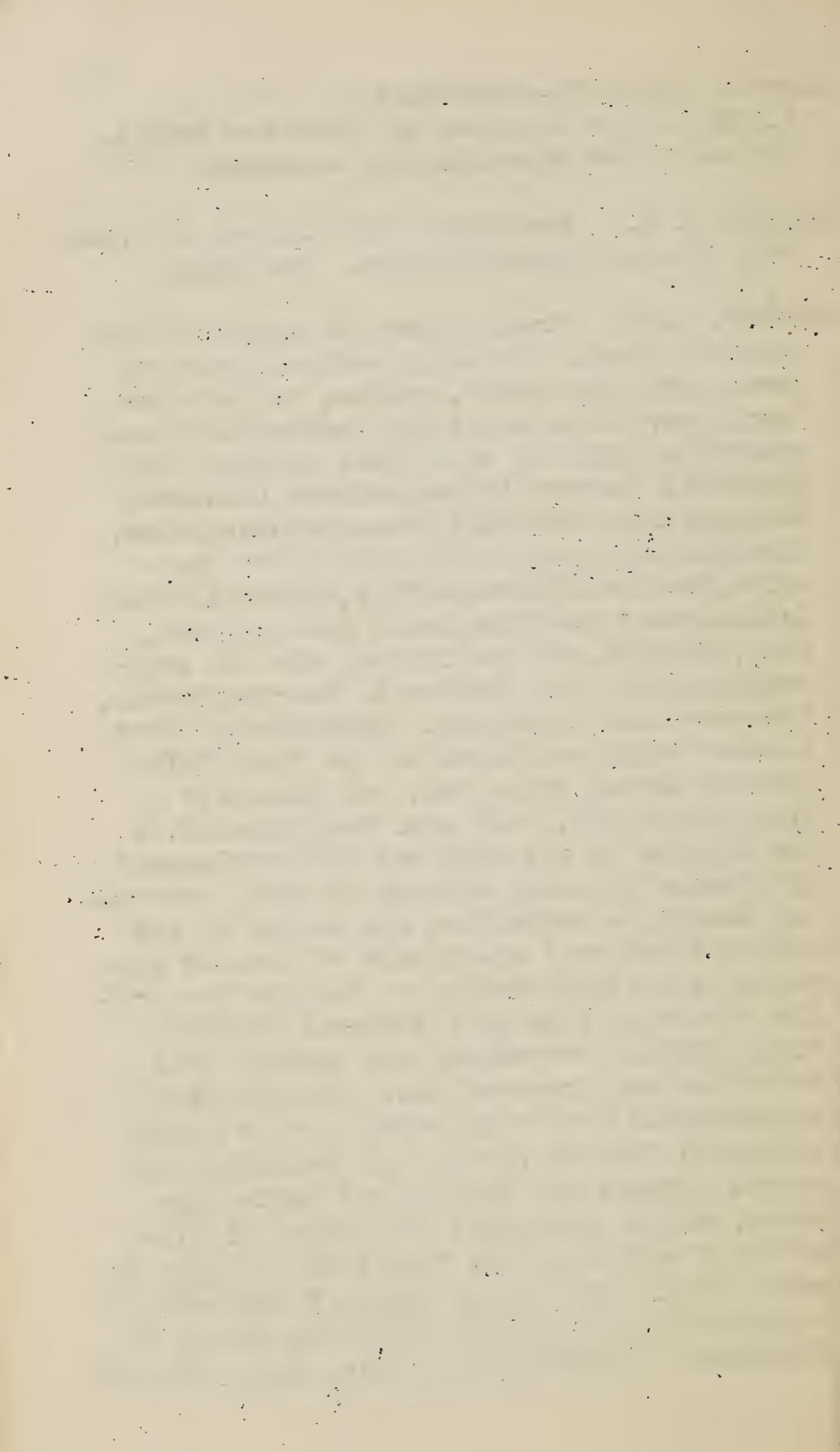


HARRIS, George W.--Continued.

\$1,800 is for salaries and \$700 for traveling and other miscellaneous expenses.

HARTER, L. L. Assistant physiologist in truck crop disease investigations. See Orton.

HARTLEY, C. P. Physiologist in charge of Corn Investigations. Breeding work and variety tests with very early, medium, or late maturing varieties are being conducted in cooperation with the experiment stations and practical farmers in Connecticut, Delaware, Florida, Idaho, Maryland, Massachusetts, Maine, Michigan, Minnesota, North Dakota, New Hampshire, New York, Nebraska, Ohio, Oklahoma, Rhode Island, South Carolina, South Dakota, Texas, Utah, Virginia, and Washington; also in cooperation with corn growers in Georgia, Kansas, Tennessee, and Wisconsin. Experimental work is also being conducted at the Plant Introduction Garden, Chico, Cal.; at Yuma, Ariz.; Brownsville, Tex.; and near Washington, D.C. The objects of the work are the development of greater yielding strains of corn, possessing desirable characters and suited to the climatic and soil conditions of various sections, and demonstrating to farmers the profits resulting from good cultural methods, high yielding varieties, and careful seed selection and preservation. Breeding and experimental work with sweet corn is being conducted for the purpose of producing improved strains for canning and table purposes, and to determine the effect of climate and soil upon the formation of sugar in sweet corn. The latter phase of the work is conducted in cooperation with the Bureau of Chemistry. Expenses this year, about \$13,500,



Hartley, C. P.--Continued.

of which \$8,000 is for salaries and \$5,500 for traveling and other miscellaneous expenses. Associated with Mr. Hartley in this work are Messrs. Ernest B. Brown, Curtis H. Kyle, and L. L. Zook.

HASSE, CLARA H. Assistant in laboratory investigations of fruit diseases. See Waite.

HASTINGS, S. H. Farm superintendent, San Antonio, Tex., Experiment Farm. See Scofield.

HAWKINS, L. A. Assistant in investigations of diseases of small fruits. See Shear, C. L.

HEADLEY, F. B. Assistant, Western Agricultural Extension. See Scofield.

HEDGCOCK, GEORGE G. Pathologist, Laboratory of Forest Pathology. Engaged in investigations of diseases of coniferous and other woods, diseases caused by mistletoe, etc. Work on forest trees and woods is being conducted chiefly on the National Forests, in close cooperation with the Forest Service; and investigations of the mistletoe diseases are being carried on throughout the Southern States, chiefly in Texas and Tennessee. The work includes the wood-rotting diseases of pines, spruces, firs, larches, and other trees in the western forests; and the damage caused by mistletoe to species of oak, elm, hackberry, cottonwood, etc. Methods of prevention are being worked out, and in the case of mistletoe possible means of extermination are being studied. Expenses this year, about \$4,400, of which \$2,200 is for salaries and \$2,200 for traveling and other miscellaneous expenses.



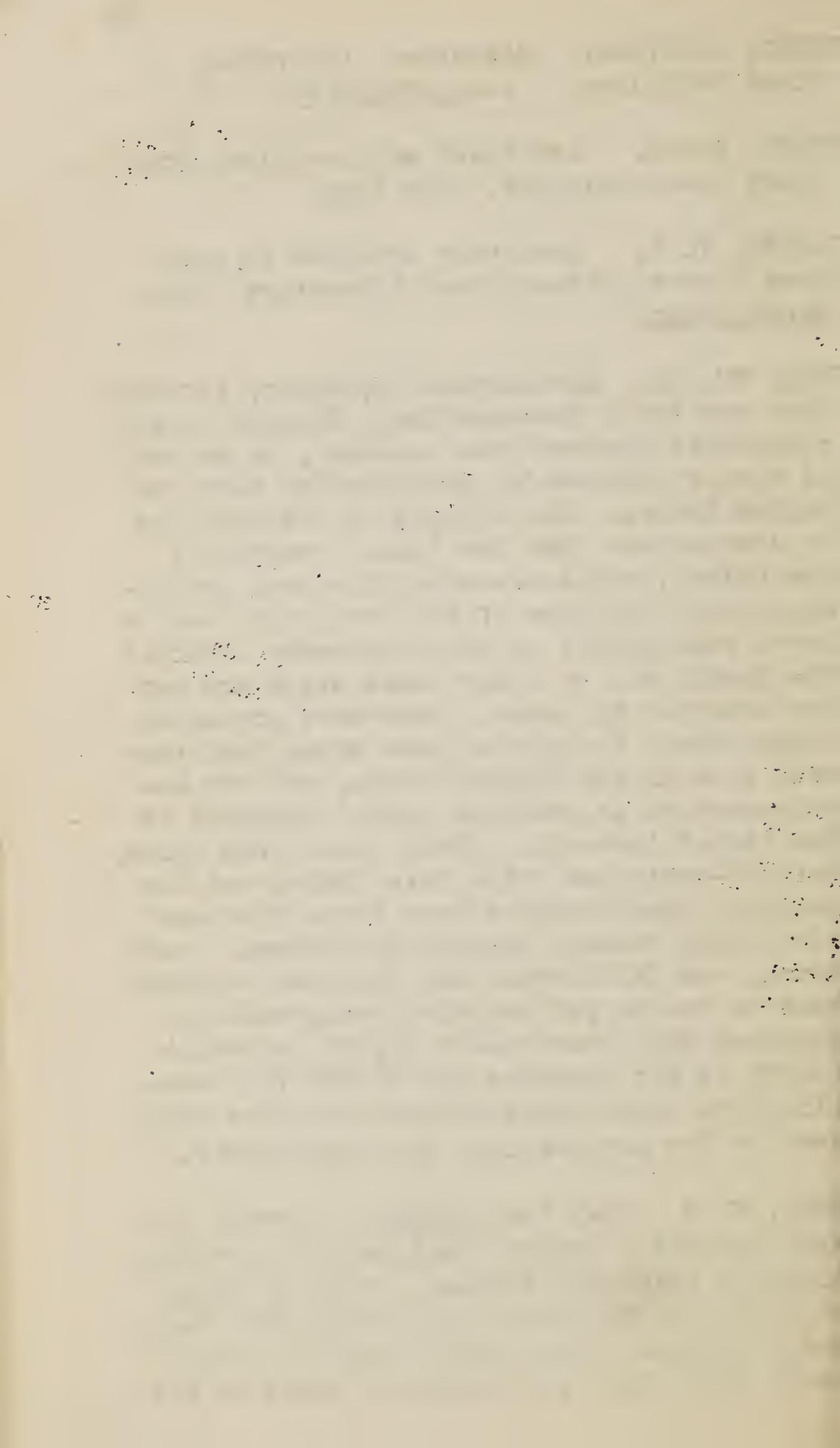
HEDGES, FLORENCE. Assistant, Laboratory of Plant Pathology. See Smith, E. F.

HENKEL, ALICE. Assistant and compiler, Drug Plant Investigations. See True.

HILLMAN, F. H. Assistant botanist in pure seed investigations, Seed Laboratory. See Brown, Edgar.

HILLS, WM. D. Agricultural explorer, Foreign Seed and Plant Introduction. Engaged in agricultural explorations in Japan, in search of timber bamboos for introduction into the United States. The objects of the work are to demonstrate that the timber bamboos of the Orient, which are among the most profitable plant cultures of the Orientals, can be grown with profit on the cane-brake lands of the South, and on other lands which are not now occupied by crops. Scattered groves of these plants in America have shown that they will grow in the United States, and the development of an American bamboo industry is the aim of the work. Hardy forms from China, drought-resistant forms from India, and the tropical giant bamboos from Porto Rico are also being tested, chiefly in Alabama, Louisiana, and California; and the uses to which bamboos can be put are also being studied. Expenses this year, about \$3,500, of which \$1,800 is for salaries and \$1,700 for traveling and other miscellaneous expenses incident to the explorations and experiments.

HINSON, W. M. Crop technologist, Tobacco Investigations. Engaged in tobacco investigations in Texas and Alabama. Work is being conducted at Palestine and Nacogdoches, Tex., and at Marion, Ala., consisting in experiments with cigar leaf tobacco; tests of the



Hinson, W. M.--Continued.

advisability of using fertilizers and cover crops on tobacco soils; and seed breeding to secure acclimatized strains of tobacco suitable to Texas and Alabama conditions. Advice relative to the construction of shade for wrapper tobacco and of tobacco curing barns, and to methods of fermentation is furnished to growers; and tests of cover crops such as peas and hairy vetch are being made. The improvement of types by breeding and selection is also a leading feature of the work. Expenses this year, about \$9,500, of which \$7,000 is for salaries and \$2,500 for traveling and other miscellaneous expenses. Mr. Hinson is assisted by Messrs. Otto Olson and J. E. Blchm.

HITCHCOCK, A. S. Systematic agrostologist, Taxonomic and Range Investigations. Engaged in the preparation of a manual of the American grasses, and in collecting information concerning the economic grasses of the world, especially those species which may prove useful in the United States or its insular possessions. Work is mainly performed at Washington, D. C., supplemented by field work in the Western States. The work has for its primary object the collection of authentic information regarding American grasses, their variation, adaptability, and economic features, to be embodied in a manual of the American grasses. The grasses received by the office of Foreign Seed and Plant Introduction are identified and that office is furnished with information to guide explorers in securing valuable grasses for trial. A digest of notes and observations as to the value of the different species of grasses for forage and for other economic purposes is being made. Expenses this year, about



Hitchcock, A. S.--Continued.

\$5,500, of which \$4,000 is for salaries and \$1,500 for traveling and other miscellaneous expenses. Mr. Hitchcock is assisted by Mrs. Agnes Chase.

HOOD, S. C. Assistant in camphor experiments, Drug Plant Investigations. See True.

HOSFORD, G. W. Assistant pomologist in fruit marketing, transportation, and storage investigations. See Powell and Taylor.

HUNTER, BYRON. Assistant agriculturist, Farm Management Investigations. In charge of work in District No. 6, embracing Oregon, Washington, Idaho, and northern California. (See Brodie.) The work in this district is essentially similar to that in the other farm management districts. Special studies are being made of wheat growing, grasses and forage plants, crop rotation, and methods of hog feeding practiced by the most successful hog raisers. Expenses this year, about \$3,000, of which \$2,000 is for salaries and \$1,000 for traveling and other miscellaneous expenses.

HUSMANN, F. L. Viticultural superintendent, Field Investigations in Pomology. See below.

HUSMANN, GEORGE C. Pomologist, Field Investigations in Pomology. Engaged in viticultural investigations. Work is being conducted at Vineland, N.J.; Enfield and Willard, N.C.; New Smyrna, Fla.; Brownsville, Tex.; and at Oakville, Fresno, Stockton, Chico, and other points in California. Cooperation with the California and New Jersey experiment stations and with the North Carolina Department of Agriculture is in effect. Ten experimental



Husmann, George C.--Continued.

Vineyards are being conducted in California, in cooperation with the Office of Foreign Seed and Plant Introduction. The object of the work in California is the preservation, improvement, and development of the Vinifera grape industry of the United States. In the South Atlantic and Gulf coast States special attention is being devoted to the development of the Rotundifolia grape industry as represented by the Scuppernong and allied varieties. In New Jersey an effort is being made to reestablish the grape industry, with special reference to the manufacture of unfermented grape juice. Miscellaneous viticultural problems are being studied in various parts of the country, as are the best methods of handling, keeping, and marketing the fruit and of the manufacture, storage, care, and disposition of the products made therefrom. Expenses this year, about \$11,500, of which \$7,000 is for salaries and \$4,500 for traveling and other miscellaneous expenses. Mr. Husmann is assisted by Messrs. Alfred Tournier and F. L. Husmann.

IRWIN, WM. N. Assistant pomologist in fruit identification and description. See Brackett.

JAMIESON, CLARA O. Assistant in laboratory studies of diseases of the sugar beet and other plants. See Townsend.

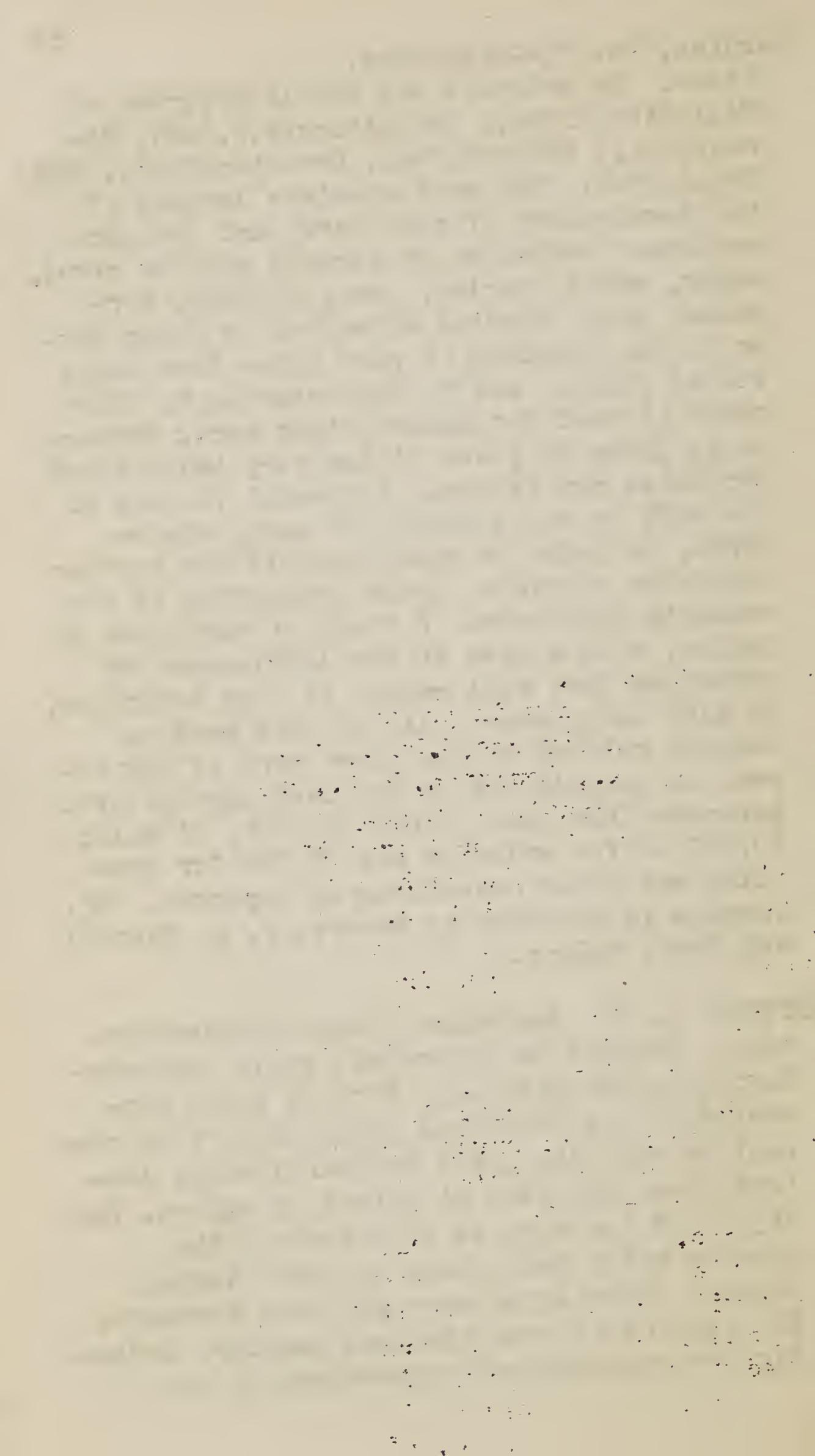
JARDINE, WM. M. Agronomist, Grain Investigations. Engaged in investigations of dry land cereals. Work is being conducted chiefly in the Great Plains Area and the dry and high intermountain districts of the West, in cooperation with the State experiment sta-



Jardine, Wm. M.--Continued.

tions. Experiments are now in progress at Williston, N. Dak.; Bellefourche, S. Dak.; Akron, Colo.; Dalhart, Tex.; Lewiston, Mont.; and Nephi, Utah. The work consists largely of the development of more hardy and drought-resistant varieties of cereals such as wheat, emmer, spelt, barley, oats, millets, sorghums, etc. Special attention is being given to the breeding of pure types from individual plants, and to the securing by this means of seed for distribution among farmers, to be grown in place of the very badly mixed varieties now in use. A special feature of the work is the securing of hardy winter types, in order to make possible the further extension of winter grain production in the semiarid districts. A study of earliness in grains, with a view to the development of varieties that will mature at high altitudes, is also being made. All of this work is closely related to the other work of the Bureau on cereals and on dry land agriculture. Expenses this year, about \$14,000, of which \$9,000 is for salaries and \$5,000 for traveling and other miscellaneous expenses. Mr. Jardine is assisted by Messrs. F. D. Farrell and Cecil Salmon.

JEFFERS, L. M. Assistant, Grain Standardization. Engaged in interstate grain transportation investigations. Work is being conducted at the principal grain centers in connection with the grain standardization laboratories, and also at points of export. The object of the work is to ascertain the changes which take place in grain during transit in railroad cars and lake steamers. The factors of condition and quality, including the moisture and temperature of the



Jeffers, L. M.--Continued.

grain, together with the relative humidity and temperature of the air at the time of loading and also at the time of discharge at destination. All of this work has an important bearing on the general problem of grain standardization. Expenses this year, about \$2,700, of which \$1,500 is for salaries and \$1,200 for traveling and other miscellaneous expenses.

JENSEN, CHARLES A. Agriculturist, Dry Land Agriculture Investigations, Bellefourche, S. Dak. See Chilcott.

JOHNSON, EDWARD C. Pathologist, Grain Investigations. Engaged in investigations of cereal diseases, especially rusts and smuts. Field work is being conducted in practically all of the grain-producing States, particularly at Fargo, N. Dak.; Brookings, S. Dak.; St. Paul and Crookston, Minn.; McPherson, Kans.; and Amarillo, Tex. Cooperation with the experiment stations of those States is in effect. Much laboratory and greenhouse investigation is necessarily connected with the work. Cultures of the different species of rusts and smuts are made, and their life histories and biologic forms studied with the object of the ultimate prevention of these diseases. It is the aim to discover the different host plants, other than grains, which harbor these parasites, so that crop arrangements can be made which will eliminate as far as possible the spread of diseases from wild host plants to cereals. In the field careful notes are taken on the resistance to disease of the different varieties of grain and an effort is being made to develop further rust-resistant varieties through hybridization and selection. The



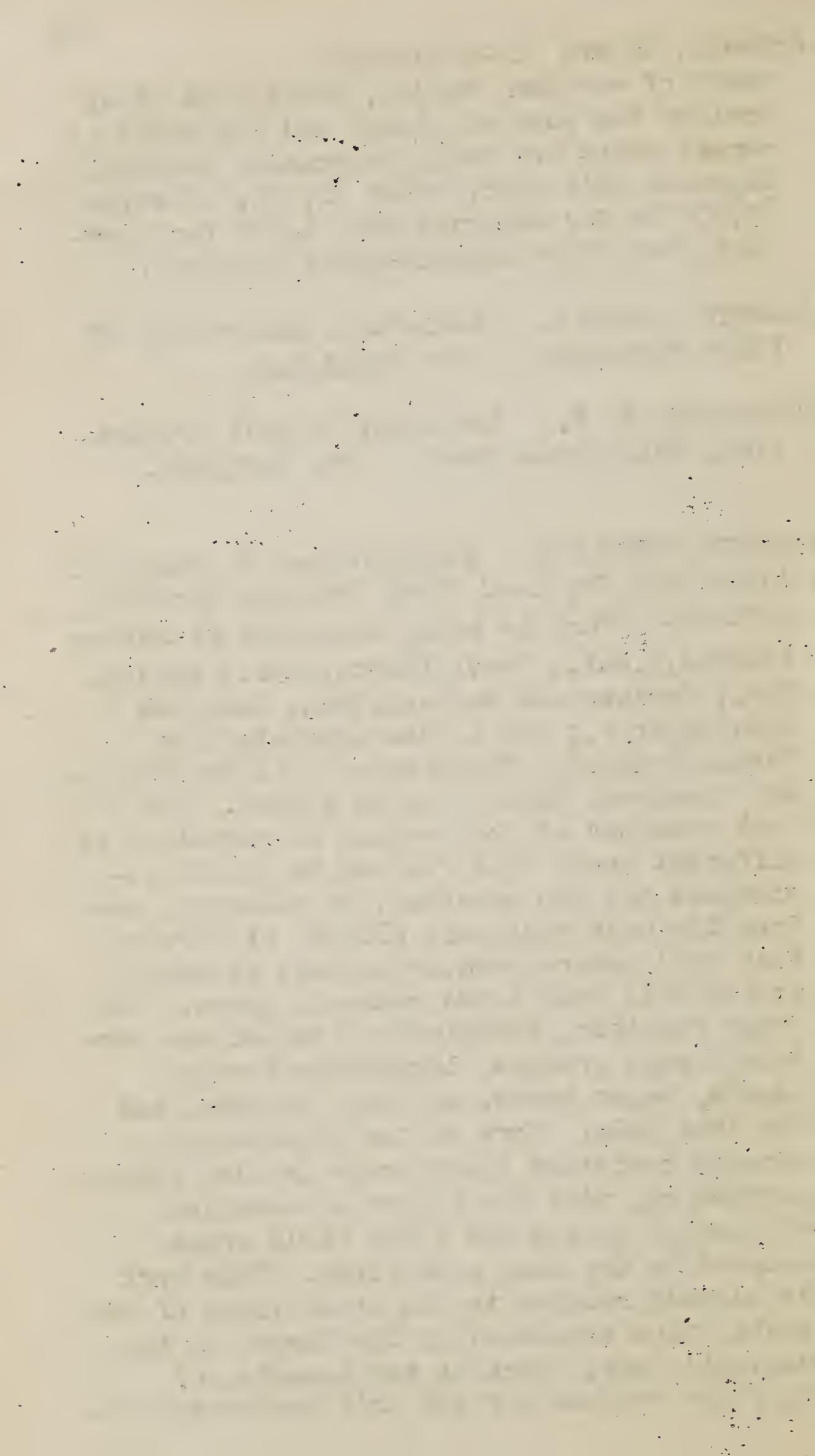
Johnson, Edward C.--Continued.

smuts of sorghum, barley, wheat, and other grains; the bunt of wheat; and the rusts of cereal crops are being especially studied. Expenses this year, about \$3,300, of which \$2,000 is for salaries and \$1,300 for traveling and other miscellaneous expenses.

JOHNSTON, JOHN R. Assistant, Laboratory of Plant Pathology. See Smith, E. F.

JUENEMANN, H. E. Assistant in bulb propagation, Bellingham, Wash. See Morrison.

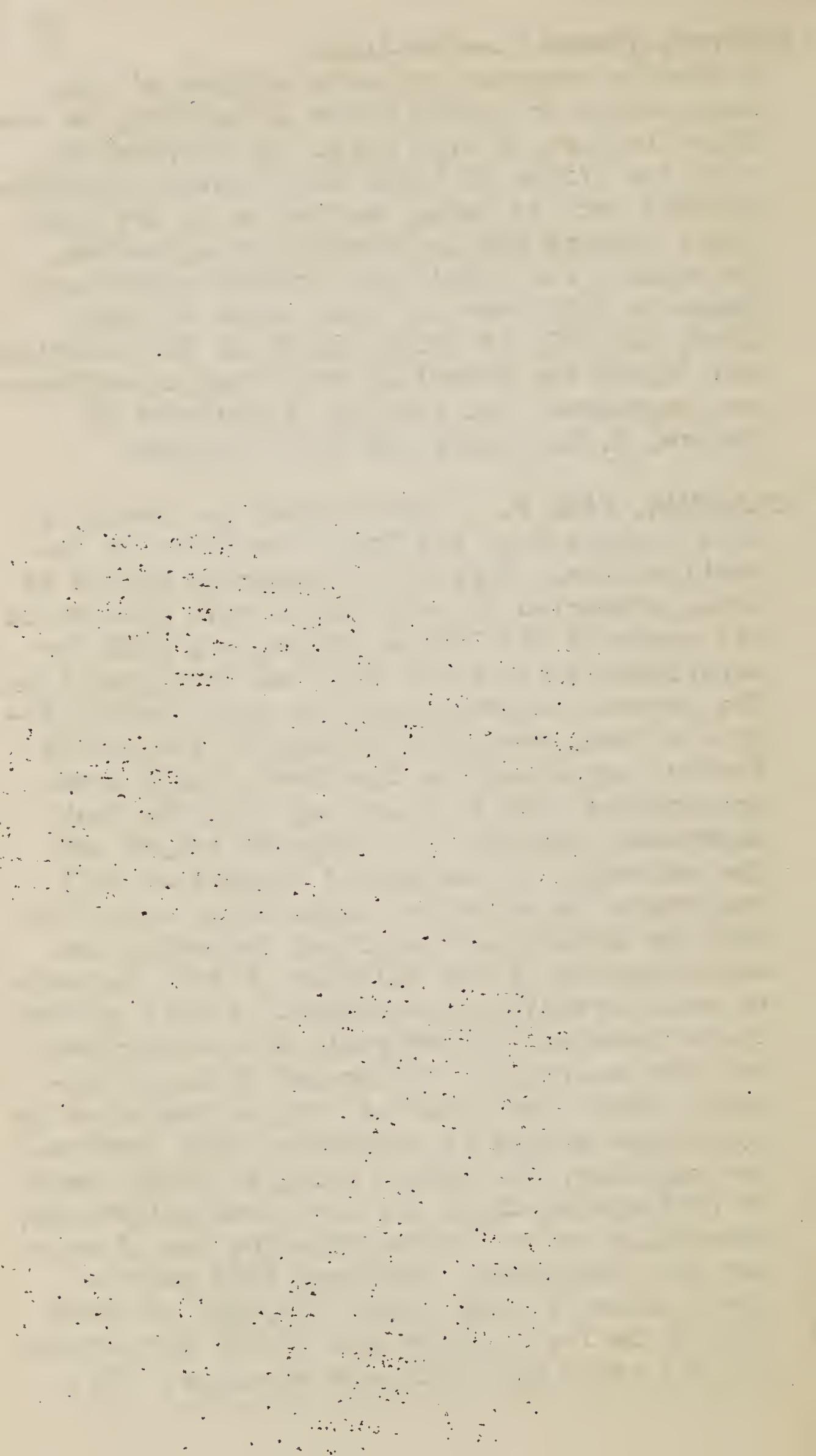
KEARNEY, THOMAS H. Physiologist in charge of Alkali and Dry Land Plant Breeding Investigations. Work is being conducted at Belle-fourche, S. Dak.; North Platte, Nebr.; Fallon, Nev.; Corinne and Garland, Utah; Yuma and Sacaton, Ariz.; and in the laboratory at Washington, D. C. Cooperation with the Nebraska Experiment Station is in effect. The work consists of the testing of varieties of different crops with respect to alkali resistance and the securing, by selecting seed from the most resistant plants, of strains that will endure greater amounts of alkali in the soil than those commonly grown. The crops receiving principal attention are various forage grasses, leguminous forage plants, sugar beets, millets, sorghum, and the date palm. Work on the breeding of drought resistant field crops is also being carried on, with the object of securing strains of forage and other field crops adapted to dry land conditions. This work is closely related to the other lines of investigation conducted by the Bureau in the semiarid West. Work on the breeding of Egyptian cottons for the arid Southwest, with



Kearney, Thomas H.--Continued.

a view to securing valuable strains of this crop suited to growth under irrigation, is another feature of this work. In cooperation with the office of Plant Life History Investigations work is being carried on in dry land olive culture and in breeding pomegranates, especially for alkali and drought resistance. Expenses this year in these lines of work, about \$12,500, of which \$8,500 is for salaries and \$4,000 for traveling and other miscellaneous expenses. Mr. Kearney is assisted by Messrs. H. L. Shantz and A. C. Dillman.

KELLERMAN, KARL F. Physiologist in charge of Soil Bacteriology and Water Purification Investigations. Work with leguminous plants is being conducted in cooperation with farmers in all parts of the United States, and with the experiment stations of Ohio and North Carolina. The general investigations in soil bacteriology are being conducted throughout the United States, especially in the Great Plains Area. Cooperative work is under way with the Utah Experiment Station. The objects sought are the extension of the use of legumes as soil renovators by effective inoculation where the soil is lacking in the proper bacteria; the determination of the relation of soil bacteria to soil fertility; the control of soil conditions favoring the desirable micro-organisms and the securing of the proper biologic balance. Water purification work is conducted as conditions demand in connection with farm water supplies, the object being to study means of controlling algal and bacterial pollutions, especially in connection with the use of copper as a treatment. Expenses this year in these lines of work, about \$19,000, of which \$14,000 is for salaries and \$5,000 for traveling and other miscellaneous expenses. Mr.



Kellerman, Karl F.--Continued.

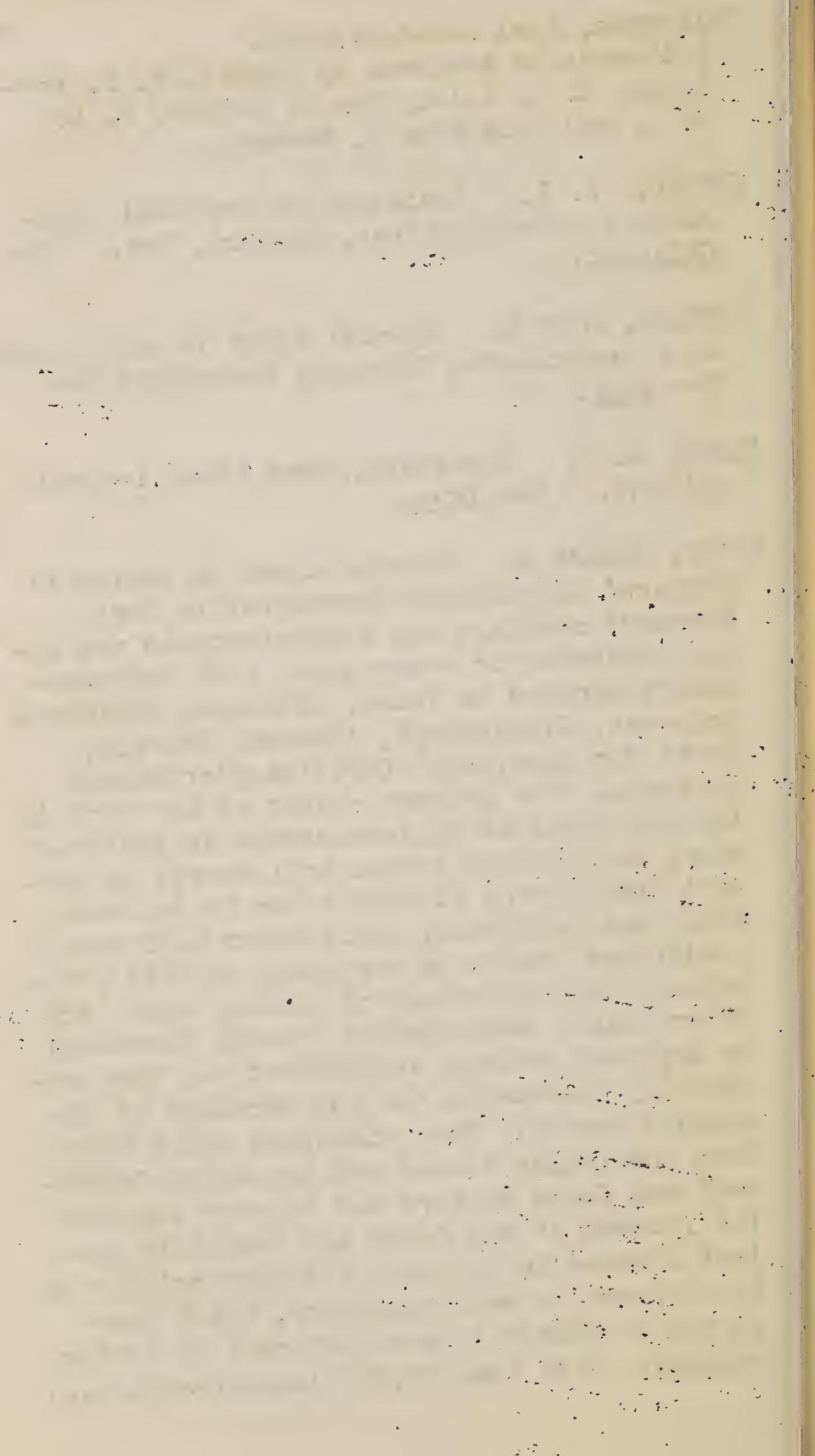
Kellerman is assisted by Messrs. T. R. Robinson, E. R. Allen, Ira G. McBeth, F. L. Goll, and Miss Edna H. Fawcett.

KENNARD, F. L. Assistant in dry land agriculture investigations, Dalhart, Tex. See Chilcott.

KINSLER, JOHN H. Special agent in cotton and corn experiments, Bionomic Investigations. See Cook.

KLUGH, G. F. Assistant, Drug Plant Investigations. See True.

KNAPP, SEAMAN A. Special agent in charge of Farmers' Cooperative Demonstration Work. Farmers' meetings and demonstrations are being conducted in cooperation with representative farmers in Texas, Oklahoma, Louisiana, Arkansas, Mississippi, Alabama, Georgia, North Carolina, South Carolina, Florida, and Virginia. The primary object of the work in the far South is to demonstrate in sections where the Mexican cotton boll weevil is present that a crop of cotton can be successfully and profitably grown under boll weevil conditions, and as a corollary to this proposition that the yield of cotton, corn, and other staple crops can be greatly increased by improved methods of cultivation, thus materially increasing the net earnings of the average farmer. The principles which have been thoroughly tested and proved by Department and State workers and by very successful farmers of the South are taught by object lessons in the way of demonstrations to the farmers in each community, which have served to awaken a great interest in better methods. More than 30,000 demonstration and



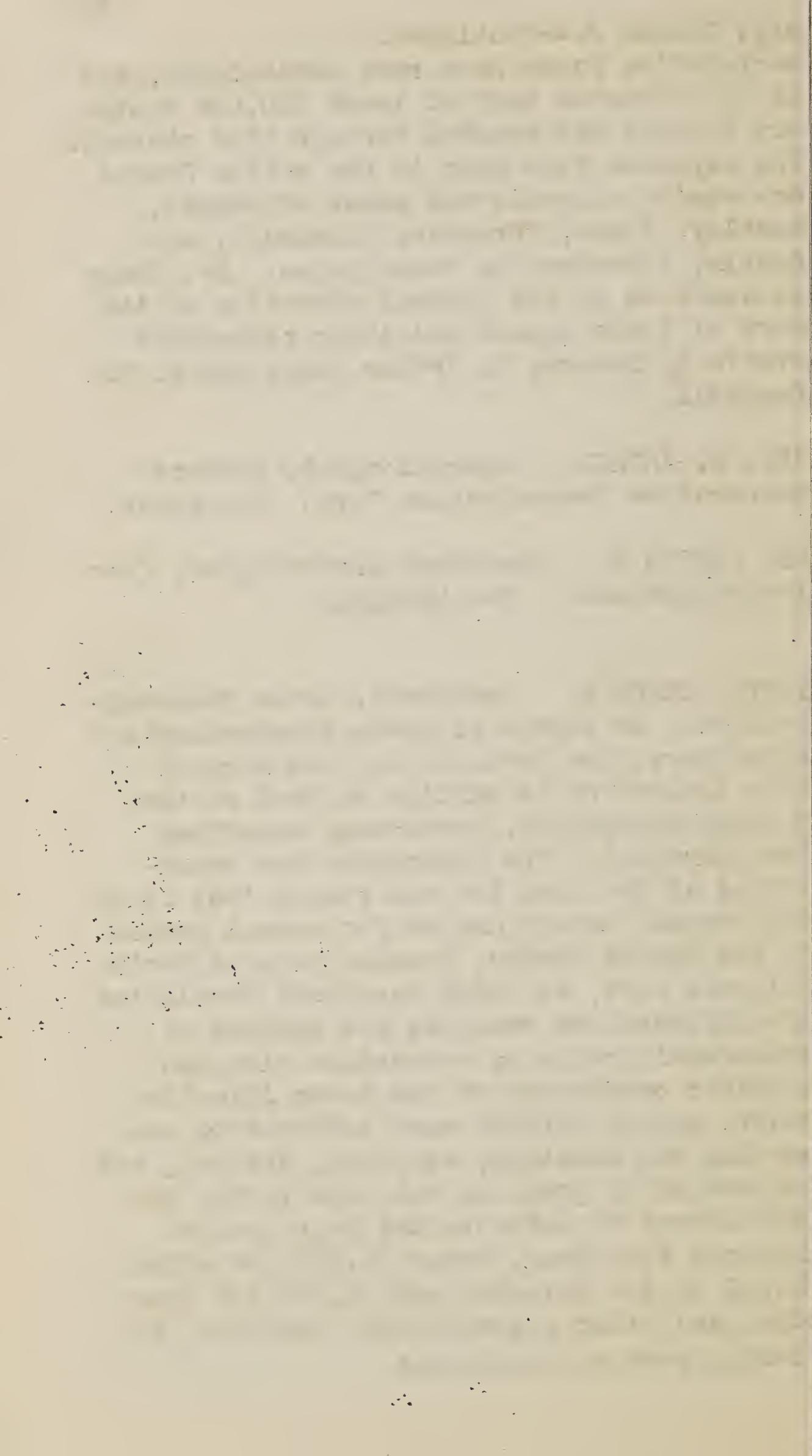
Knapp, Seaman A.--Continued.

cooperative farms have been established, and it is estimated that at least 300,000 southern farmers are reached through this channel. The expenses this year in the cotton States are stated opposite the names of Messrs. Bentley, Evans, Procter, Quicksall, and Savely, elsewhere in these pages. Dr. Knapp is assisted in the general direction of the work of these agents and their respective staffs by Messrs. S. Arthur Knapp and J. P. Campbell.

KNAPP, S. ARTHUR. Special agent, Farmers' Cooperative Demonstration Work. See above.

KYLE, CURTIS H. Assistant physiologist, Corn Investigations. See Hartley.

LEIGHTY, CLYDE E. Assistant, Grain Standardization, In charge of grain standardization laboratory, New York, N. Y. The work at this laboratory is similar to that at the Chicago laboratory, previously described (see Carroll). The laboratory was established at New York for the reason that it is the largest export market for cereal grains in the United States, besides being a North Atlantic port, at which excellent facilities are afforded for studying all classes of commercial grains in connection with the climatic conditions of the North Atlantic coast, and to collect such information concerning the handling, shipping, storing, and inspecting of grain as will aid in the establishment of definite and fair grades. Expenses this year, about \$5,500, of which \$3,500 is for salaries and \$2,000 for traveling and other miscellaneous expenses, including rent and equipment.



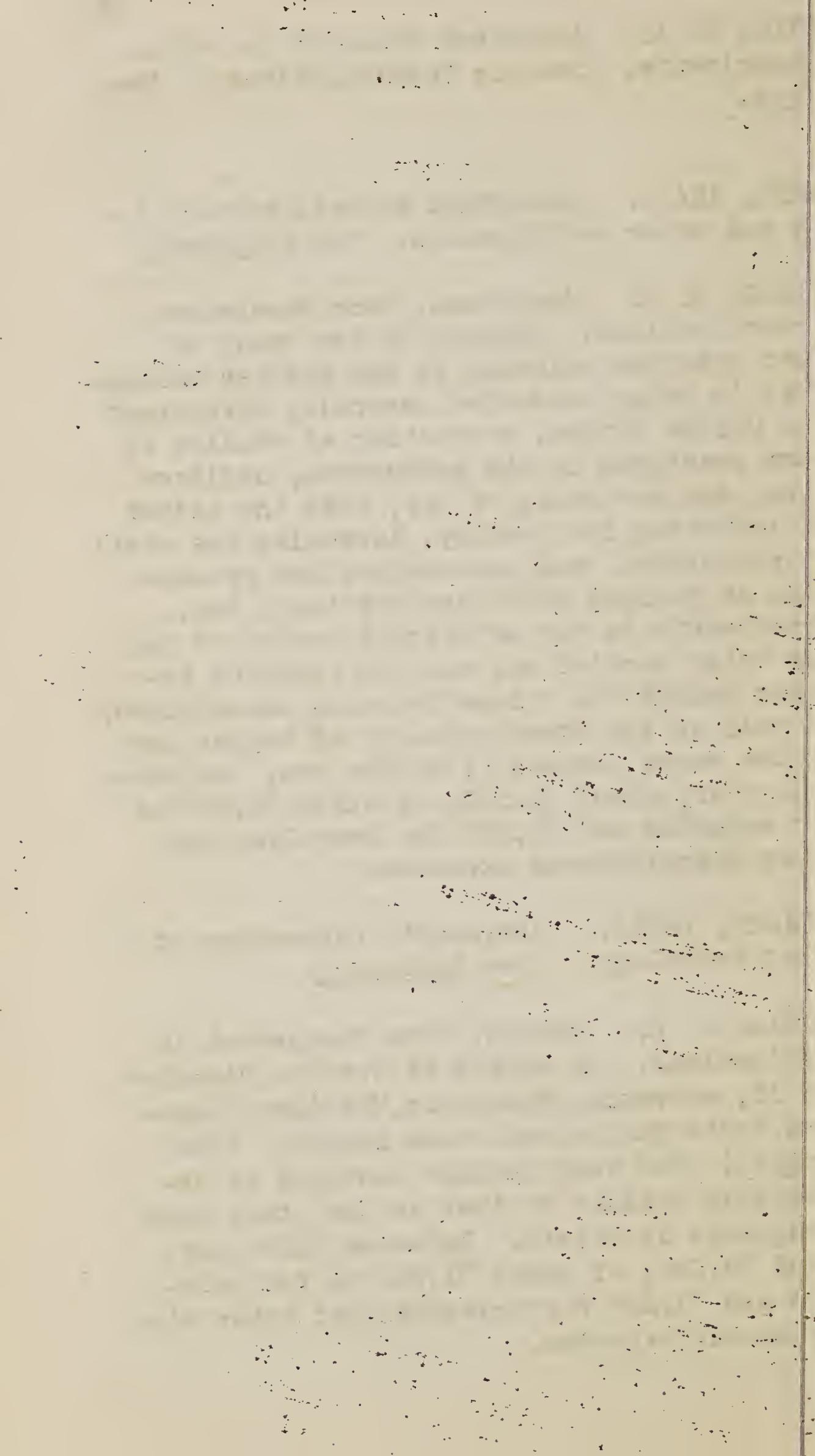
LENTON, F. L. Assistant botanist in cotton experiments, Bionomic Investigations. See Cook.

MCBETH, IRA G. Assistant in soil bacteriology and water purification. See Kellerman.

MCCLURE, H. B. Assistant, Farm Management Investigations. Engaged in the study of farm practice relating to hay and hay making. Work is being conducted generally throughout the United States, consisting of studies of farm practices in the production, utilization, and marketing of hay, with the object of improving its quality, lessening the cost of production, and encouraging hay production in regions which now buy their hay. Experiments in the artificial curing of hay are being carried on; and the relation between weight and volume is being ascertained, as well as the practicability of buying hay in the stack instead of by the ton. Expenses this year, about \$4,500, of which \$2,200 is for salaries and \$2,300 for traveling and other miscellaneous expenses.

MCCULLOCH, LUCIA. Assistant, Laboratory of Plant Pathology. See Smith. E. F.

MCDOWELL, J. C. Expert, Farm Management Investigations. In charge of work in District No. 11, embracing Wisconsin, Michigan, Minnesota, North Dakota, and South Dakota. (See Brodie.) The work in this district is essentially similar to that in the other farm management districts. Expenses this year, about \$3,000, of which \$1,800 is for salaries and \$1,200 for traveling and other miscellaneous expenses.



MCKAY, A. W. Expert in fruit storage, Field Investigations in Pomology. See Powell.

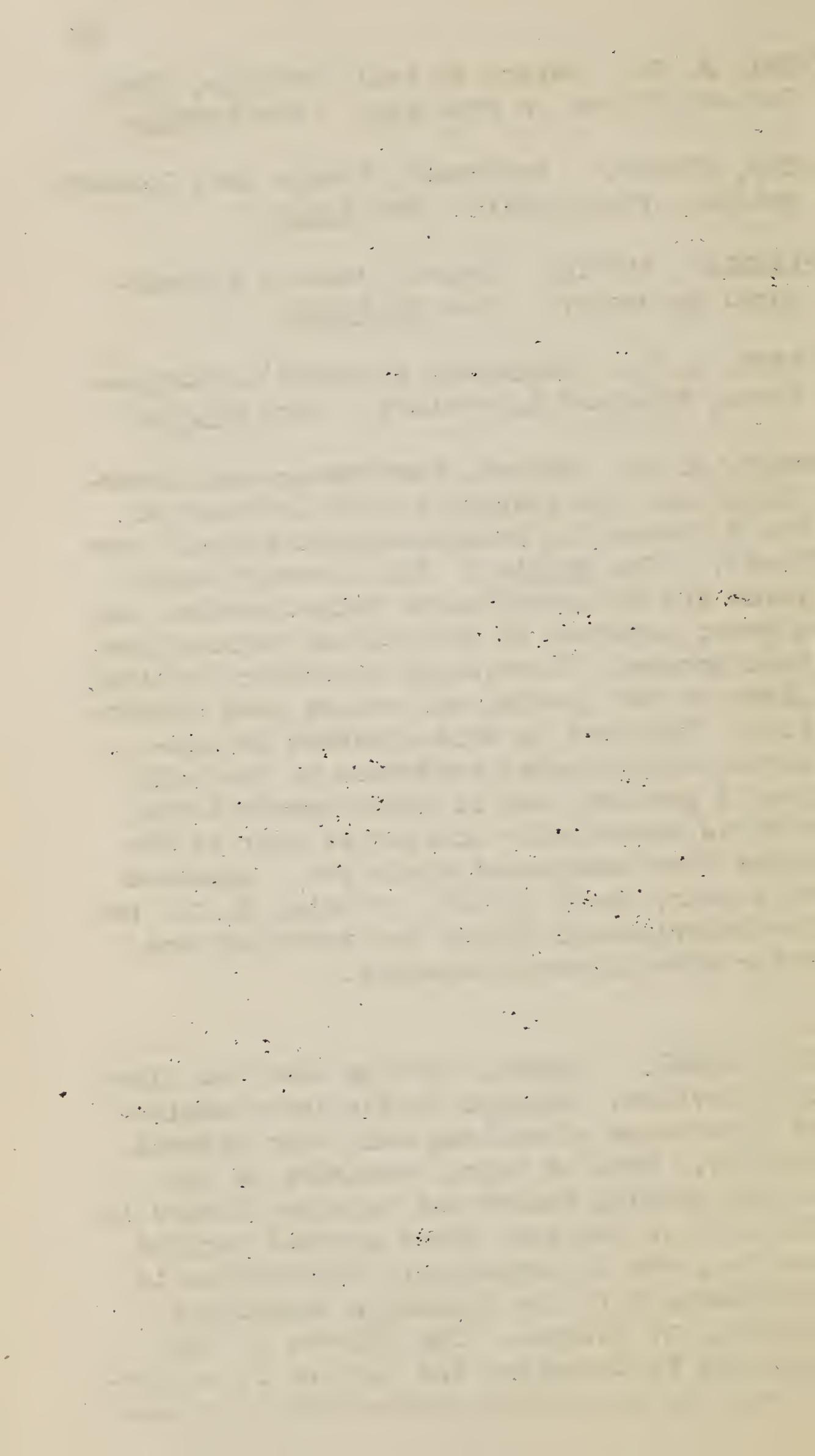
MCKEE, ROLAND. Assistant, Forage Crop Investigations, Chico, Cal. See Piper.

MCLACHLAN, ARGYLE. Expert, Western Agricultural Extension. See Scofield.

MCLANE, J. W. Assistant in field investigations, Physical Laboratory. See Briggs.

MCNAIR, A. D. Expert, Farm Management Investigations. In charge of work in District No. 3, embracing Louisiana, Arkansas, and east Texas. (See Brodie.) Six diversification farms are in operation in this district, and a great interest in diversified farming has been aroused. Particular attention is being given to hay growing and cowpea seed production. The work in this district is conducted with special reference to the boll weevil problem, and in other respects the work is essentially similar to that in the other farm management districts. Expenses this year, about \$3,200, of which \$2,000 is for salaries and \$1,200 for traveling and other miscellaneous expenses.

MANN, ALBERT. Expert, Foreign Seed and Plant Introduction. Engaged in the introduction of pure races of malting and other special barleys. Work is being conducted in the barley growing States and in other States in which it is believed these special barleys can be grown to advantage. Cooperation is maintained with the Minnesota Experiment Station, at St. Paul. The objects of the work are to determine the factors to be considered by the barley grower in the produc-



Mann, Albert--Continued.

tion of these special barleys used largely for the production of malt and for other purposes; also to test and create pure races of the so-called pedigreed barleys of both European and American origin and to find out which kinds of soil and climate best meet the requirements of these different varieties. Both laboratory and field investigations are connected with the work. Expenses this year, about \$5,000, of which \$3,000 is for salaries and \$2,000 for traveling and other miscellaneous expenses, including the purchase and importation of new seed. Dr. Mann is assisted by Mr. Dana W. Frear.

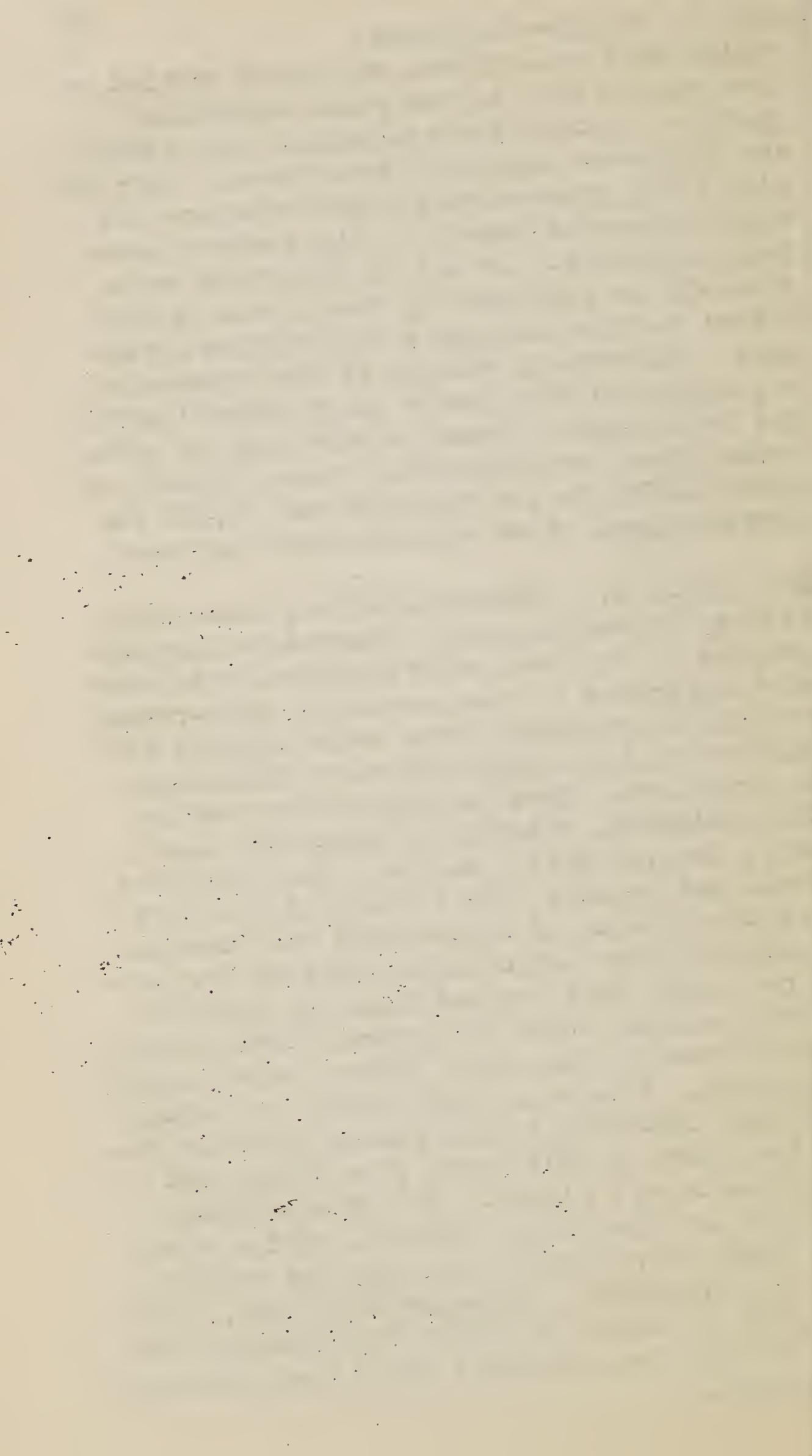
MARSH, C. DWIGHT. Expert, Poisonous Plant Investigations. Engaged in field investigations and experiments with poisonous plants. Work is being conducted at Hugo, Colo., and at other points throughout the stock grazing areas of the West, particularly on the National Forests. Chief attention is being given to the cause and prevention of the "loco" disease of animals. The connection of the disease with the loco plants has been proved, and it has been shown that the poisonous substance is Barium. Courses of treatment for the cure of locoed animals have been worked out as a result of laboratory and field investigation. Feeding experiments with horses, cattle, and sheep are being carried on, in order to obtain further knowledge of loco poisoning and if possible to find a remedy applicable to range conditions. Work on the effect of lupine feeding is under way; and investigations to determine definitely the number of plants which may be considered as loco plants, as well as their distribution and their relation to pe-



Marsh, C. Dwight--Continued.

cular soil conditions, are being carried on. Involved in this is the still unsettled question whether the recognized loco plants are poisonous under all conditions. Work is also being prosecuted on the larkspurs and other poisonous plants in the western mountain districts. In all of this work material aid is furnished by the agents of the Forest Service through a cooperative agreement. Laboratory studies of the poisonous principles of the plants under investigation are being made. Expenses this year in poisonous plant investigations, about \$9,000, of which \$5,000 is for salaries and \$4,000 for traveling and other miscellaneous expenses.

MASON, SILAS C. Arboriculturist, Plant Life History Investigations. Engaged in investigations of dry land arboriculture, with special reference to the growing of deep-rooted or drought-resistant tree crops adapted for culture in dry regions where no irrigation is practiced. Work is being conducted in the Southwest, chiefly at Mecca and Indio, Cal.; Sacaton, Ariz.; and at points in Texas, Utah, and Nevada. The objects of the work are the finding of deep-rooted and drought-resistant tree crops better adapted for culture in dry land regions than the shallow-rooted annual crops now grown. Nuts, fruits, and olives are the chief plants under investigation. Promising wild plants are being tested, including a wild almond from the Pacific coast, a wild peach from Texas, and various desert plants. Drought-resistant olives are also being studied, with a view to their introduction into the dry regions of the Southwest. Expenses this year, about \$4,500, of which \$3,300 is for salaries and \$1,200 for traveling and other miscellaneous expenses.

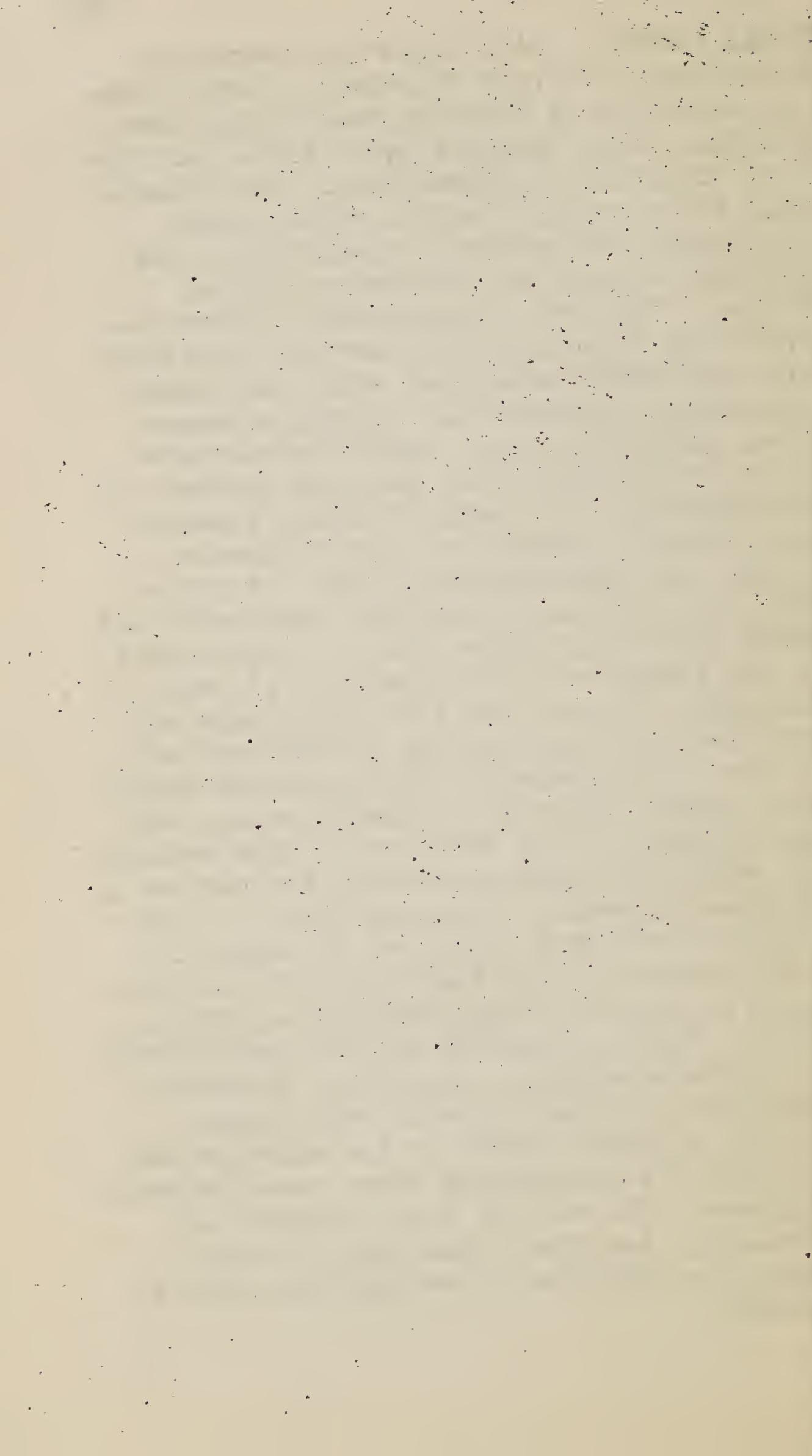


MATHEWSON, E. H. Crop technologist, Tobacco Investigations. Engaged in tobacco investigations in Maryland, Virginia, and North Carolina, in addition to associate supervision of all Tobacco Investigations, with special reference to the work on export and manufacturing types of tobacco. The work in the three States mentioned above is being conducted at Upper Marlboro, Md.; Appomattox, Chatham, Rustburg, Bowling Green, and Louisa, Va.; and in Pitt County N.C. Cooperation with the Maryland and Virginia experiment stations is in effect. The work consists of the improvement of types by breeding and selection; tests of fertilizers and improved cultural methods for tobacco; and crop rotation demonstrations with tobacco, wheat, corn, grasses, cowpeas, and crimson clover. Tobacco is the central feature and stands as the leading and most important money crop in the rotation experiments. The object of the work is to demonstrate the benefits and increased profits resulting from an improved, systematic, and intensively conducted crop rotation. Improved methods of saving and separating tobacco seed are also being introduced, and tobacco growers are being encouraged to take up the systematic breeding of tobacco. Expenses this year in these phases of the work, about \$9,500, of which \$6,500 is for salaries and \$3,000 for traveling and other miscellaneous expenses. Associated with Mr. Mathewson in this work is Mr. W. W. Green, and they are assisted by Messrs. D. E. Brown and R. P. Cocke.

MEADE, R. M. Assistant in cotton and corn experiments, Bionomic Investigations. See Cook.



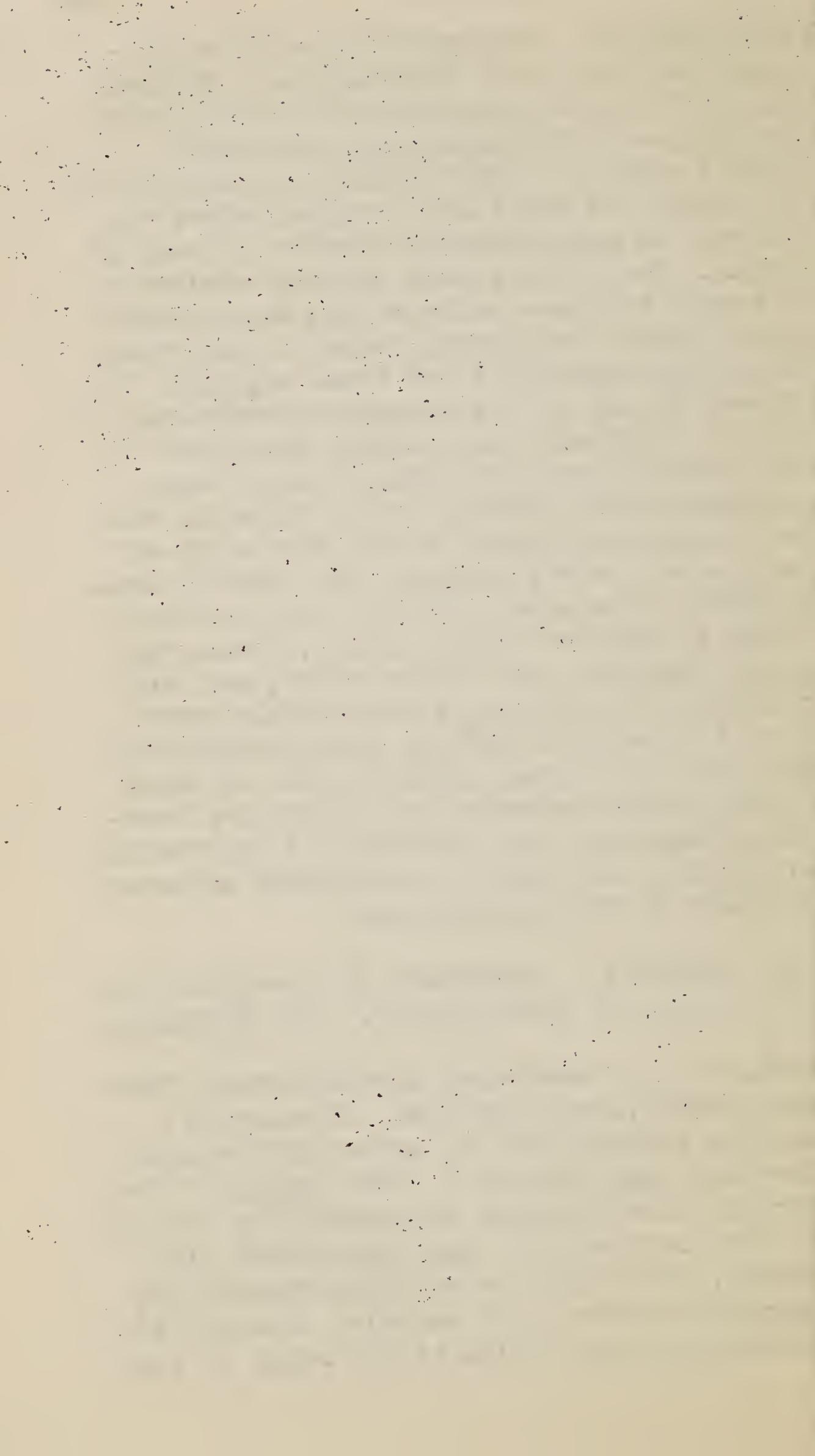
METCALF, HAVEN. Pathologist in charge of Laboratory of Forest Pathology. Work is being conducted at Westbury, Cold Spring Harbor, Lake Clear Junction, Lyons Falls, and New York City, N.Y.; Ducktown, Tenn.; New Orleans, La.; Biltmore, N.C.; and at other points throughout the country, especially in the National Forests in the western United States. The work is conducted in close co-operation with the Forest Service, and also with the State experiment stations, lumber companies, railroads and telephone companies, nurseries, etc. Among the subjects under investigation are the bark disease of the chestnut, the decay of mining timbers, the effect of sulphur and other gases on trees, the leaf-dropping disease of white pine, the various diseases of ornamental and shade trees and shrubs, and a general study of the occurrence and prevalence of tree diseases. Studies are also being made of the histology and cytology of wood-rot and of various diseases of coniferous and deciduous trees, forest tree nursery stock, etc. The objects of this work are to find methods for controlling and preventing the various diseases affecting trees and woods. In addition to the work on forest diseases, investigations of rice blast and of other diseases of rice are being carried on, with a view to their prevention and the development of disease-resistant varieties. Expenses this year in these lines of work, about \$7,500, of which \$4,500 is for salaries and \$3,000 for traveling and other miscellaneous expenses. The work of Drs. Hedgcock and Spaulding, described elsewhere in these pages, is conducted in association with Dr. Metcalf.



MEYER, FRANK N. Agricultural explorer, Foreign Seed and Plant Introduction. Engaged in agricultural explorations in China, for the purpose of securing new and useful plants adapted to the climatic conditions of our arid West and Plains region, where the climate is approximately similar to that of China. Among the plants already secured as a result of these explorations are a seedless Chinese persimmon, known as the Pekin, which has been tried and found superior in flavor to any of the Japanese persimmons, as well as harder; and valuable varieties of the Chinese date, or jujube, among them a seedless form. These, it is believed, will be valuable additions to the fruits of our arid southwestern region. The north Chinese peaches, of unusual promise; large collections of Chinese pears, grapes, plums, apples, cherries, and other fruits; and very valuable collections of ornamentals have also been secured and are being propagated. Expenses this year, about \$5,000, of which \$1,600 is for salaries and \$3,400 for traveling expenses, the purchase and importation of plants, and other miscellaneous expenses incident to the explorations.

MILES, GEORGE F. Assistant in investigations of diseases of small fruits. See Shear, C. L.

MILLER, H. A. Assistant agriculturist, Farm Management Investigations. In charge of work in District No. 8, embracing Virginia, Maryland, and Delaware. (See Brodie.) The work in this district is essentially similar to that in the other farm management districts. The chief crops being studied are peanuts, tobacco, and cereals. Special attention is being given to the study of farm



MILLER, H. A. --Continued.

practice in cereal culture and to the collection of phenological data in all parts of the country regarding crop production--the dates of planting and harvesting and the dates when the crops planted at a given time are ready for use for different purposes. Expenses this year, about \$2,600, of which \$1,600 is for salaries and \$1,000 for traveling and other miscellaneous expenses.

MITCHELL, GEORGE F. Assistant in South Carolina tea investigations. See Frue.

MORRIS, E. L. Assistant, Grain Standardization. In charge of grain standardization laboratory, St. Louis, Mo. The work at this laboratory is similar to that at the Chicago laboratory, previously described (see Carroll). The laboratory was established at St. Louis for the reason that it is one of the principal distributing and milling points for the hard and soft winter wheats grown in the middle Northwest section. There is also much grain, including corn, shipped from this point to the gulf ports for export. Expenses this year, about \$4,800, of which \$3,300 is for salaries and \$1,500 for traveling and other miscellaneous expenses.

MORRISON, LISLE. Assistant in general charge of Seed Distribution. Work includes the securing and distribution on Congressional and other order of quantities of vegetable, flower, lawn grass, and cotton seed, as well as bulbs, grapevines, and strawberry plants; and the propagation and distribution of select varieties of improved cotton seed, tobacco seed, citrus, trees, etc. The distribution of seeds to schools throughout the country for school-garden purposes is also a



Morrison, Lisle--Continued.

feature of the work. A bulb propagating garden is maintained at Bellingham, Wash., where a study of the methods of propagating hyacinths, tulips, and narcissuses is being made, with a view to the development of a home bulb industry to supply the American markets and to avoid the present necessity of importing these bulbs from Holland. Expenses this year in these phases of the seed distribution, about \$180,000, of which \$35,000 is for salaries and \$145,000 for the expenses connected with the purchase, packing, and distribution of seeds and plants. Associated with Mr. Morrison in this work is Mr. J. E. W. Tracy, with Mr. C. A. Neal as assistant in seed cleaning and Mr. H. E. Juenemann as assistant in bulb propagation.

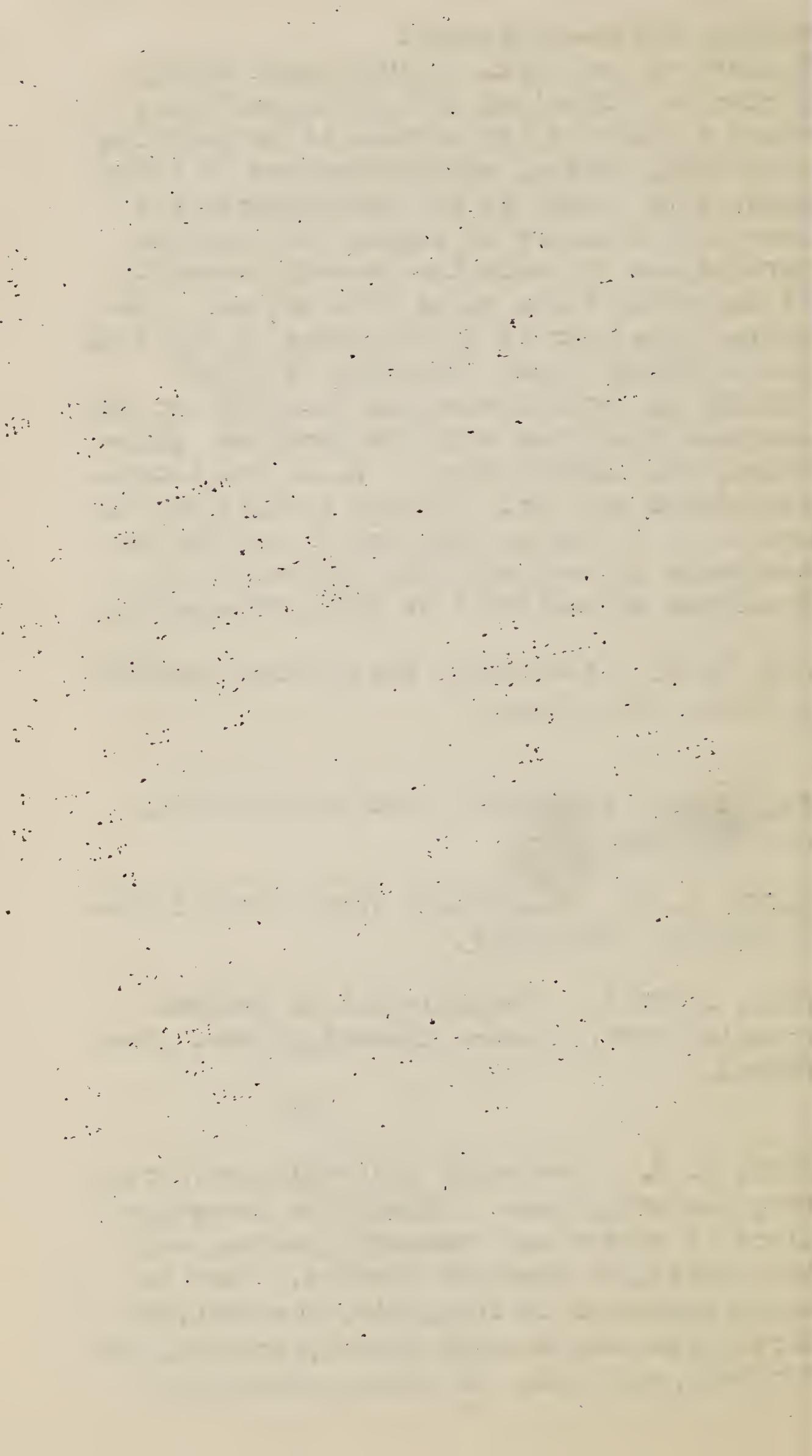
MORSE, W. J. Assistant, Forage Crop Investigations. See Piper.

NEAL, C. A. Assistant, Seed Distribution. See Morrison.

NIELSEN, H. T. Assistant, Forage Crop Investigations. See Piper.

NORTON, JESSE B. Physiologist in general breeding work, Tobacco Investigations. See Shamel.

OAKLEY, R. A. Assistant agrostologist, Forage Crop Investigations. Engaged in investigations of native and standard grasses, and the testing of improved strains. Work is being conducted in Iowa, Ohio, Wisconsin, New York, North Dakota, South Dakota, Virginia, West Virginia, and Texas, in close cooperation

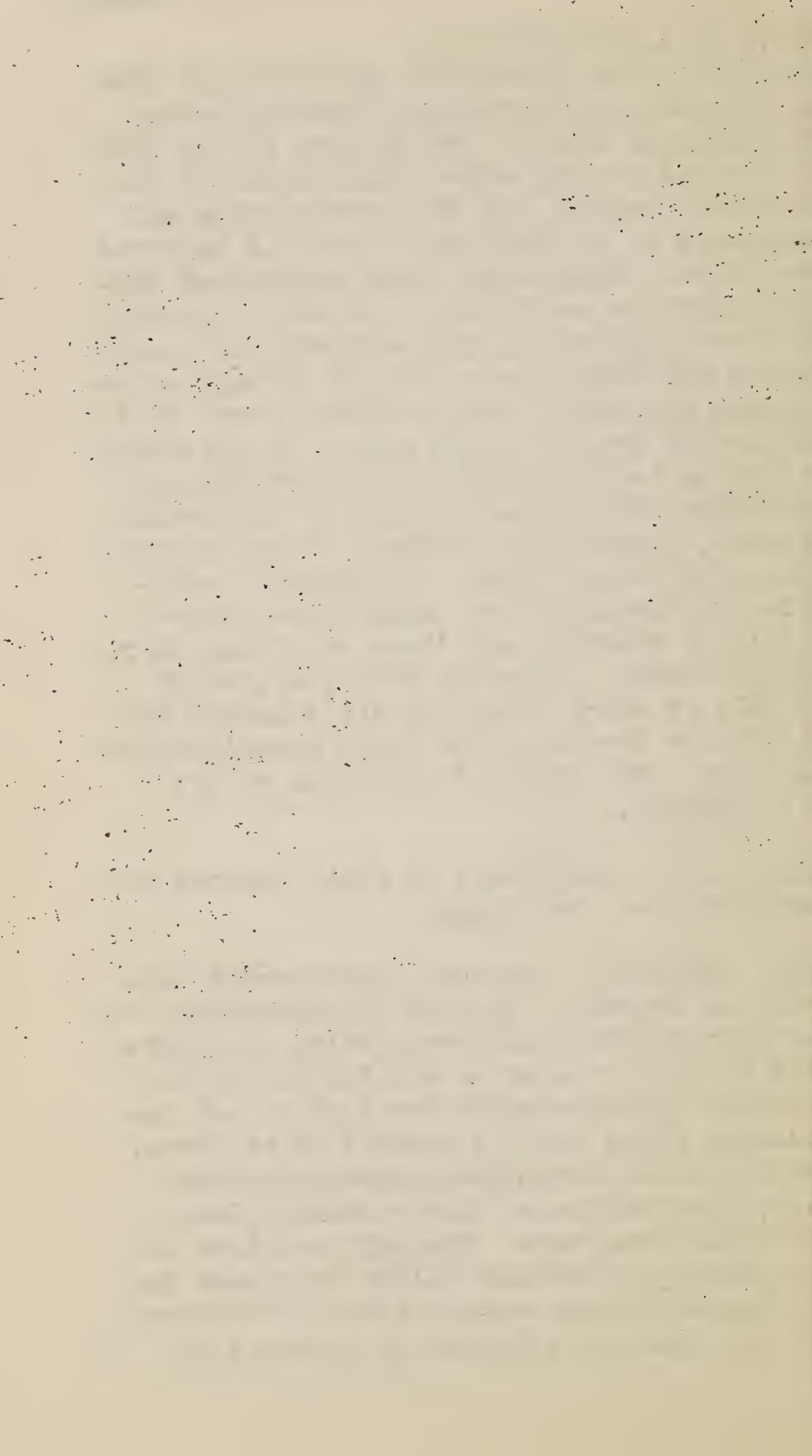


Oakley, R. A.---Continued.

with the State experiment stations; and also in Colorado, Nevada, Montana, Wyoming, Kansas, Missouri, and Idaho. The objects of the work in general are the wider utilization of the standard grasses, and the introduction and extension of the culture of new and improved varieties. Experiments with meadow and pasture mixtures are being conducted. Success has been obtained in the extension of meadow fescue and brome grass, and an attempt to establish the native western wheat grass as a cultivated crop is being made. Considerable attention is being paid to the breeding and selection of improved strains of cultivated grasses, especially timothy, redtop, orchard grass, and brome grass. A number of valuable strains have been established, especially of timothy, and these are being thoroughly tested. Expenses this year, about \$6,500, of which \$4,000 is for salaries and \$2,500 for traveling and other miscellaneous expenses. Mr. Oakley is assisted by Mr. H. N. Vinall.

O'GARA, P. J. Assistant in fruit disease investigations. See Waite.

OLIVER, GEORGE W. Expert, Experimental Gardens and Grounds. Engaged in experiments in the hybridization and propagation of plants. Work is being conducted chiefly in the Department greenhouses at Washington, but incidental field work is carried on at Santa Ana, Longbeach, Riverside, Loomis, and Ukiah, Cal.; Brownsville and Raymondsville, Tex.; and Bellingham, Wash. The work consists of the growing of Bermuda lilies from seed in the United States, with a view to eliminating the loss now incurred by florists in

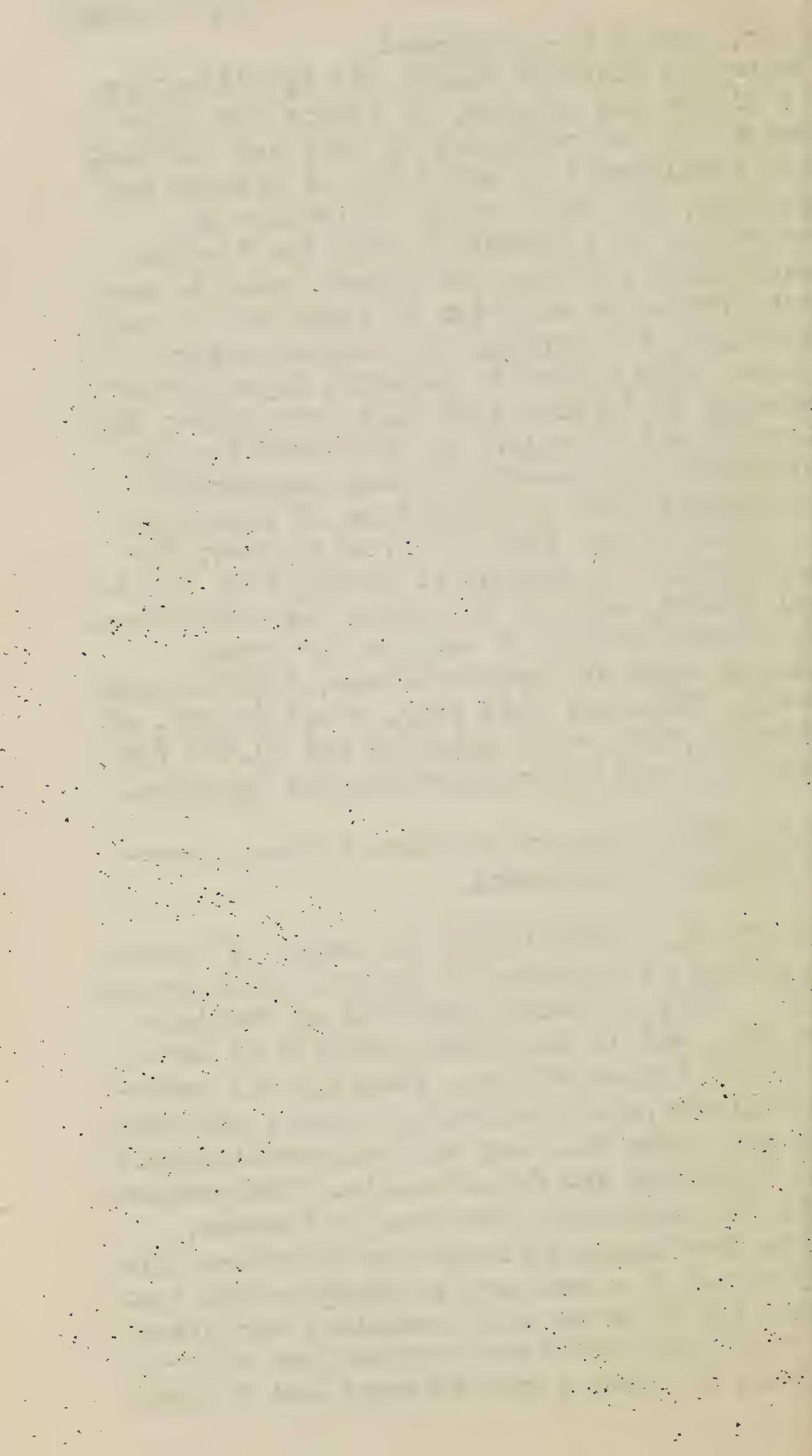


Oliver, George W. - Continued.

importing diseased bulbs; the hybridization of clover and alfalfa, to obtain new types which will be resistant to cold and disease; the development of new forms of grasses and cowpeas; the improvement of lettuce by crossing, in cooperation with the Florida experiment station, the object being to secure varieties superior to those now in cultivation; the growing of tomatoes under glass, with a view to securing types better adapted to forcing than those now grown; the improvement of celery by hybridization, to eliminate pithiness and other undesirable characters; the hybridization of asparagus, to obtain forms that will resist rust; the improvement of methods of propagating tropical fruits, such as the mango and mangosteen; the hybridization of various flowering plants, such as chrysanthemums, dahlias, and roses. Expenses this year, about \$4,000, of which \$3,000 is for salaries and \$1,000 for traveling and other miscellaneous expenses.

OLSON, OTTO. Expert in Texas tobacco investigations. See Hinson.

ORTON, W. A. Pathologist in charge of Investigations of Diseases of Cotton, Truck Crops, Etc. Work is being conducted at Burlington, Vt., and in the South, chiefly at Norfolk and Portsmouth, Va.; Auburn, N.C.; Hartsville, Lamar, and Monetta, S.C.; Cairo and Edison, Ga.; Glen St. Mary and Gainesville, Fla.; and Notasulga and Columbia, Ala. Cooperation with the experiment stations of Vermont, North Carolina, and Florida is in effect. The objects of the work are to study cotton diseases and to breed wilt resistant varieties; to breed wilt resistant cowpeas and watermelons; to study pecan diseases and to find



Orton, W. A.--Continued.

means of their control or prevention; to work out methods for the control of diseases of the bean, cucumber, cabbage, potato, pea, carrot, and other truck crops, and to investigate the comparative resistance of varieties to disease; to study the nutrition diseases of truck crops, as well as the general prevalence of plant diseases in the United States. For the latter purpose a comprehensive plant disease survey is conducted in cooperation with the State experiment stations. Expenses this year, about \$10,500, of which \$8,000 is for salaries and \$2,500 for traveling and other miscellaneous expenses. Mr. Orton is assisted by Messrs. W. W. Gilbert, L. L. Harter, and Miss Adeline Ames.

PATTERSON, FLORA W. Mycologist in charge of Pathological Collections. Work is conducted entirely at Washington, D.C., and includes the identification of diseased plant material received from correspondents; critical identifications for the pathological workers of the Bureau and for the collaborators assisting in the plant disease survey; and the maintenance of mycological and host indexes of both American and foreign species. A mycological exchange is maintained for the benefit of experiment station workers and collaborators, for the purpose of extending the geographical knowledge of species, and procuring new species, both native and foreign. The work also includes the inspection of all plants imported by the office of Foreign Seed and Plant Introduction, as well as those prepared for deportation. Microscopic examinations for the presence of parasitic fungi are made, to guard against the introduction of new diseases with the imported



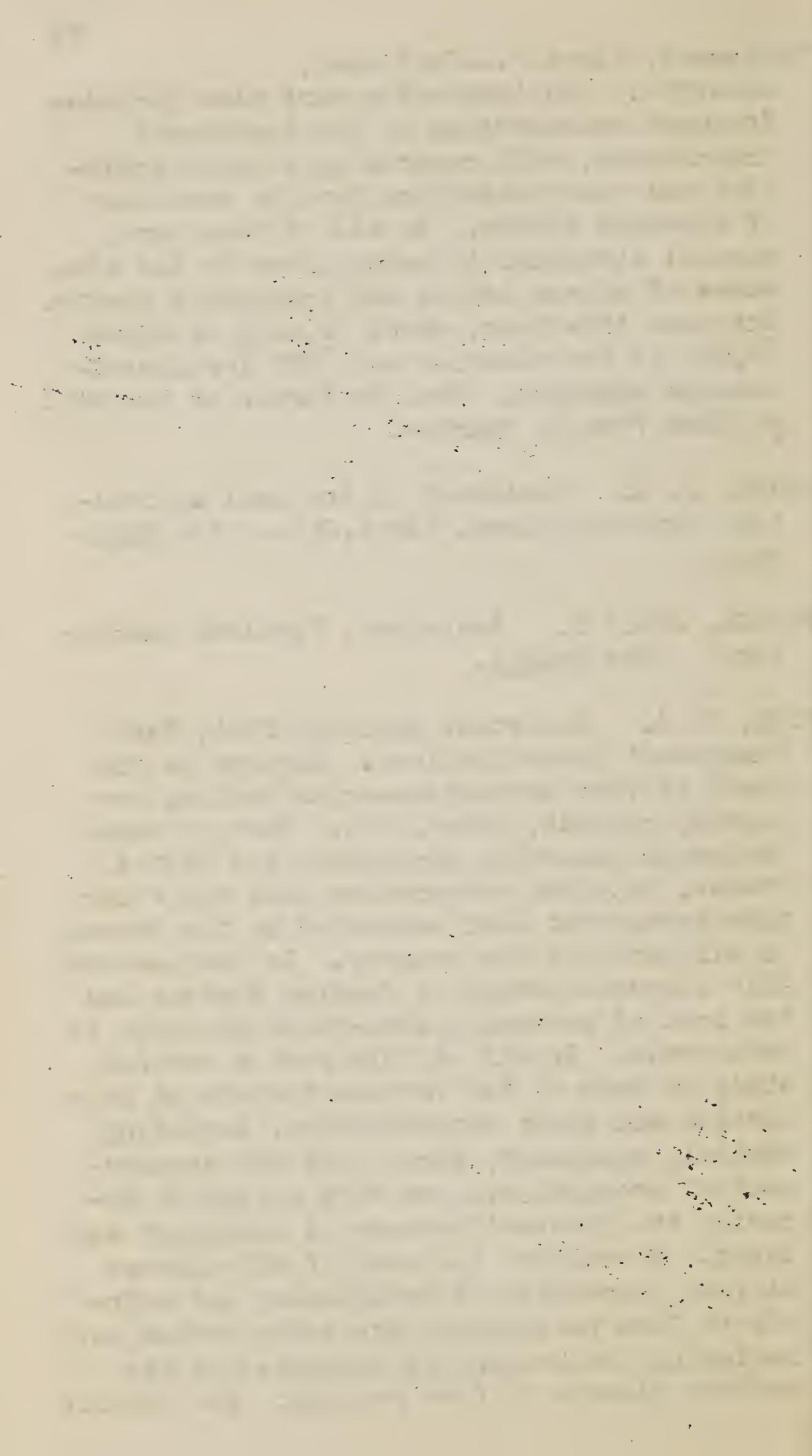
Patterson, Flora W.--Continued.

material. The inspection work also includes frequent examinations of the Department greenhouses, with reports upon their condition and recommendations for the treatment of diseased plants. In all of this work special attention is being given to the diseases of citrus fruits and ornamental plants. Expenses this year, about \$5,400, of which \$5,000 is for salaries and \$400 for miscellaneous expenses. Mrs. Patterson is assisted by Miss Vera K. Charles.

PAYNE, J. E. Assistant in dry land agriculture investigations, Akron, Colo. See Chilcott.

PEARCE, JULIA R. Assistant, Physical Laboratory. See Briggs.

PECK, W. A. Assistant agriculturist, Farm Management Investigations. Engaged in the study of farm economics--organization, accounts, records, labor, etc. Work is being conducted generally throughout the United States, in close cooperation with the other farm management work conducted by the Bureau in all parts of the country. In Indiana and Ohio a special study of feeding systems and the cost of producing live-stock products is being made. In all of this work a careful study is made of the various factors of production and their interrelation, including capital, equipment, labor, and the arrangement of cropping systems with a view to securing the greatest economy of equipment and labor. A study of the cost of all classes of farm operations is being made; and methods of farm bookkeeping are being worked out, including the keeping of accounts and the various classes of farm records. The records



Peck, W. A.---Continued.

obtained in the conduct of object-lesson farms (see Brodie) are kept and used in connection with this work. Expenses this year in these phases of the work, about \$7,500, of which \$4,500 is for salaries and \$3,000 for traveling and other miscellaneous expenses. The work of Mr. L. W. Ellis on farm equipment, previously described in these pages, is conducted in association with Mr. Peck.

PETERSON, W. A. Farm superintendent, Western Agricultural Extension, Yuma, Ariz. See Scofield.

PIPER, C. V. Agrostologist in charge of Forage Crop Investigations. Work is being conducted in many States in cooperation with individuals, and cooperation with the experiment stations of Virginia, Minnesota, Texas, and Washington is in effect. Extensive testing and breeding work is being conducted on the Arlington Experimental Farm, Va., especially with cowpeas, soy beans, and other annual legumes; at Chillicothe, Tex., especially with sorghums; at Pullman, Wash., with vetches and Canada peas; and at Chico, Cal., with winter legumes. The work has for its objects the improvement of the methods of handling forage crops, the extension of standard crops into sections where they are not well known, the introduction of new and improved varieties throughout the United States, and the testing of crops adapted to special conditions. The work covers all forage crops and those used especially for soil improvement. Expenses this year in these phases of the work, about \$21,500, of which \$12,500 is for salaries and \$9,000 for traveling and other miscellaneous expenses.



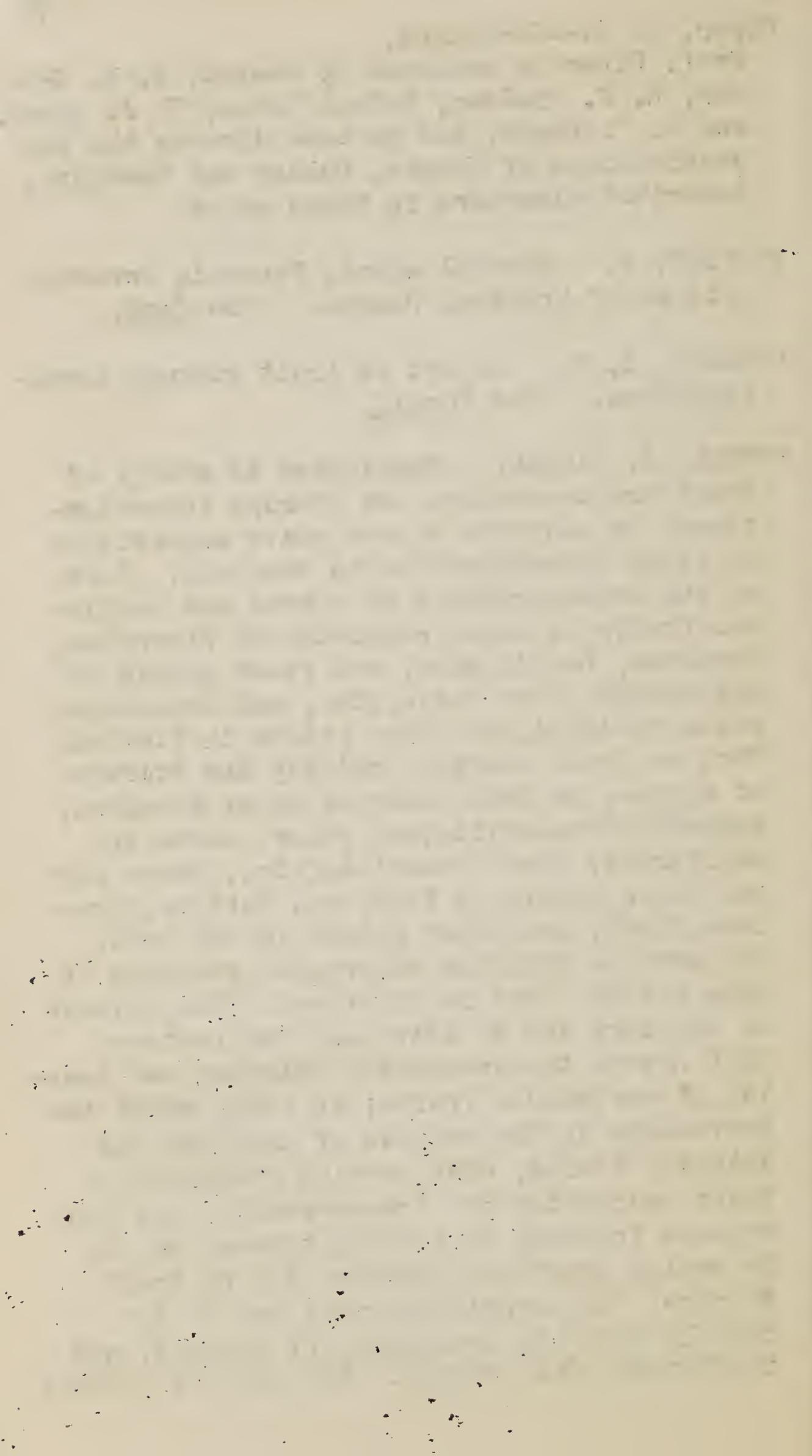
Piper, C. V.--Continued.

Prof. Piper is assisted by Messrs. A. B. Conner, H. T. Nielsen, Roland McKee, W. J. Morse, and H. W. Evans; and he also directs the investigations of Messrs. Oakley and Westgate, described elsewhere in these pages.

PITTIER, H. Special agent, Bionomic Investigations of Tropical Plants. See Cook.

POMEROY, C. S. Expert in fruit storage investigations. See Powell.

POWELL, G. HAROLD. Pomologist in charge of fruit transportation and storage investigations, in addition to associate supervision of Field Investigations in Pomology. Work on the transportation of citrus and deciduous fruits is being conducted at Riverside, Pasadena, Los Angeles, and other points in California; Fort Valley, Ga.; and Orlando, Arcadia, Wildwood, and other points in Florida. Work on fruit storage, chiefly the storage of apples, is being carried on at Pasadena, Redlands, Watsonville, and other points in California; Grand Junction, Colo.; Mason City and other points in Iowa; and Buffalo, Syracuse, Ghent, and other points in New York. Cooperation with the experiment stations of Iowa and New York is in effect. The objects of the work are to determine the factors that govern the successful shipping and keeping of perishable fruits; to bring about improvements in the methods of handling and shipping fruits, with special reference to their precooling for transportation and the methods followed in packing houses; and to determine practical methods of farm fruit storage. In Georgia the work has to do chiefly with the precooling of peaches; and in Florida with oranges. The work is closely



Powell, G. Harold--Continued.

related to the fruit marketing investigations conducted by Mr. Wm. A. Taylor, described later. Expenses this year, about \$36,000, of which \$18,000 is for salaries and \$18,000 for traveling and other miscellaneous expenses. Mr. Powell is assisted by Messrs. A. V. Stubenrauch, L. S. Tenny, S. J. Dennis, G. W. Hosford, C. S. Pomeroy, H. M. White, and A. W. McKay.

PROCTER, W. F., and J. L. QUICKSALL. Special agents, Farmers' Cooperative Demonstration Work. In charge of demonstration work in Texas, Mr. Procter in east Texas, with headquarters at Tyler, and Mr. Quicksall in west Texas, with headquarters at Waco. This is a part of the cooperative demonstration work conducted under the direction of Dr. S. A. Knapp and is similar to that conducted in eastern Oklahoma, previously described (see Bentley). Expenses this year, about \$36,000, of which \$27,000 is for salaries and \$9,000 for traveling and other miscellaneous expenses. Assisting in the work is a corps of field agents.

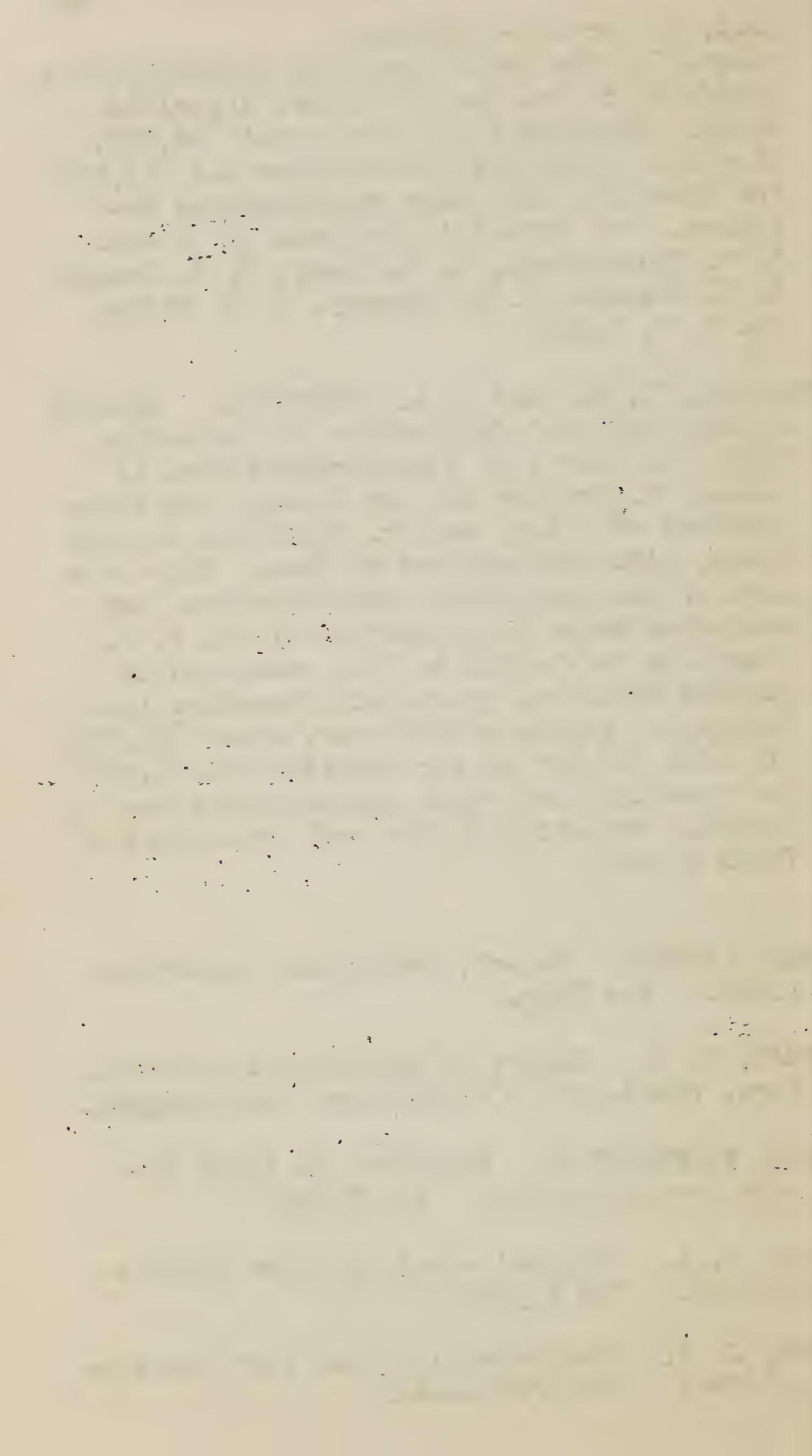
RABAK, FRANK. Expert, Drug Plant Investigations. See True.

RAGAN, W. H. Expert in pomological nomenclature, Pomological Collections. See Brackett.

RAND, FREDERICK V. Assistant in fruit disease investigations. See Waite.

REED, C. A. Special agent in pecan investigations. See Taylor.

REED, J. F. Assistant in sugar beet investigations. See Tracy, J. E.



RICHEY, E. C. Assistant, Grain Standardization. In charge of grain standardization laboratory, New Orleans, La. The work at this laboratory is similar to that at the Chicago laboratory, previously described (see Carroll). The laboratory was established at New Orleans for the reason that it is an extreme southern or Gulf export grain market, through which large quantities of northern grown corn are annually exported, thus affording excellent facilities for studying the effects of extreme climatic changes upon grain passing through this market at different seasons of the year. A study of the artificial drying of corn is also being made. Expenses this year, about \$4,300, of which \$3,000 is for salaries and \$1,300 for traveling and other miscellaneous expenses, including rent and equipment.

RICKER, P. L. Assistant, Economic Collections. See Wight.

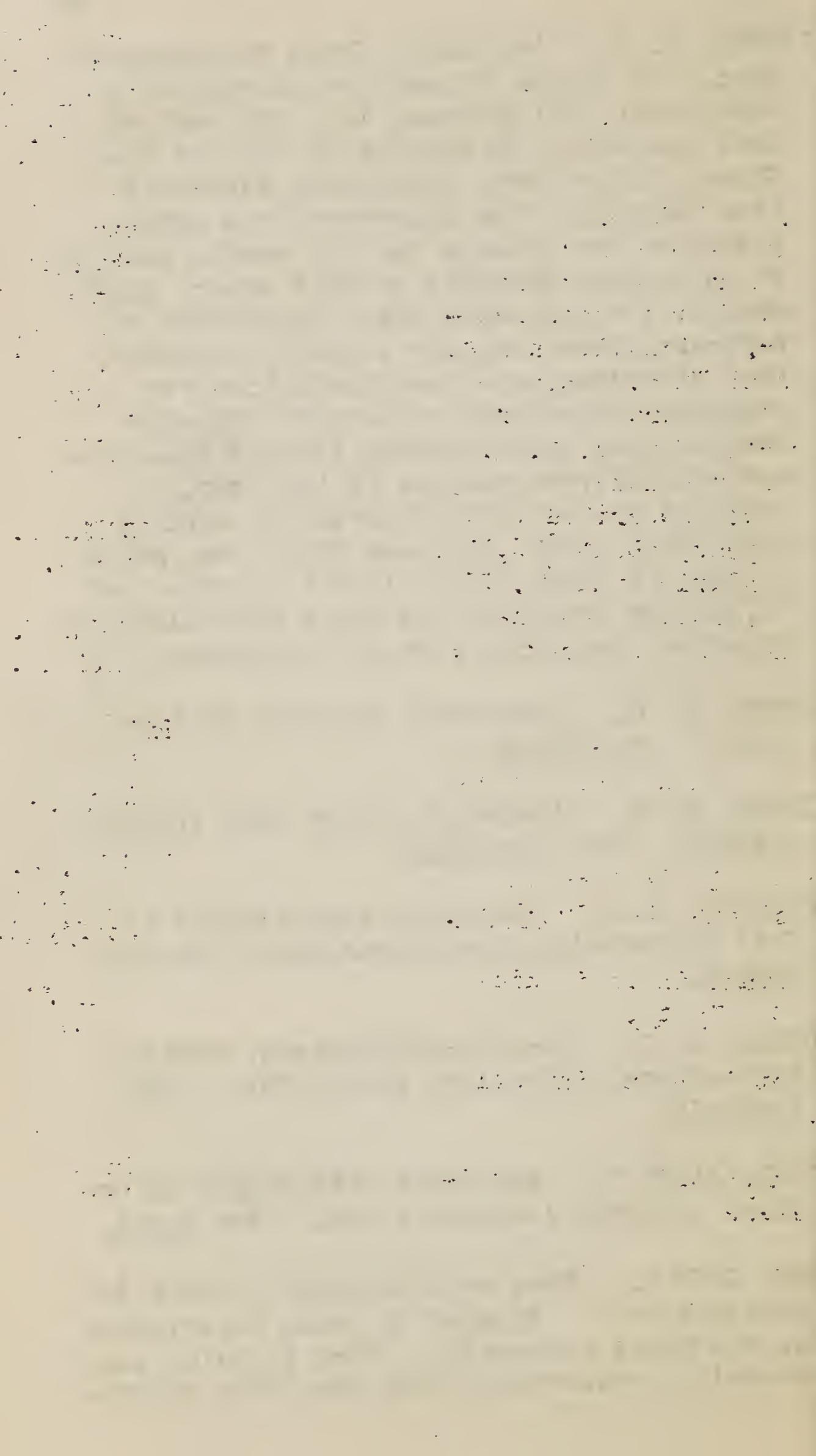
RITTUE, E. C. Assistant, Sugar Beet Investigations. See Townsend.

ROBINSON, T. R. Assistant physiologist in Soil Bacteriology Investigations. See Kelerman.

ROGERS, S. J. Farm Superintendent, Western Agricultural Extension, Fallon, Nev. See Scofield.

RORER, JAMES B. Assistant pathologist in orchard spraying demonstrations. See Scott.

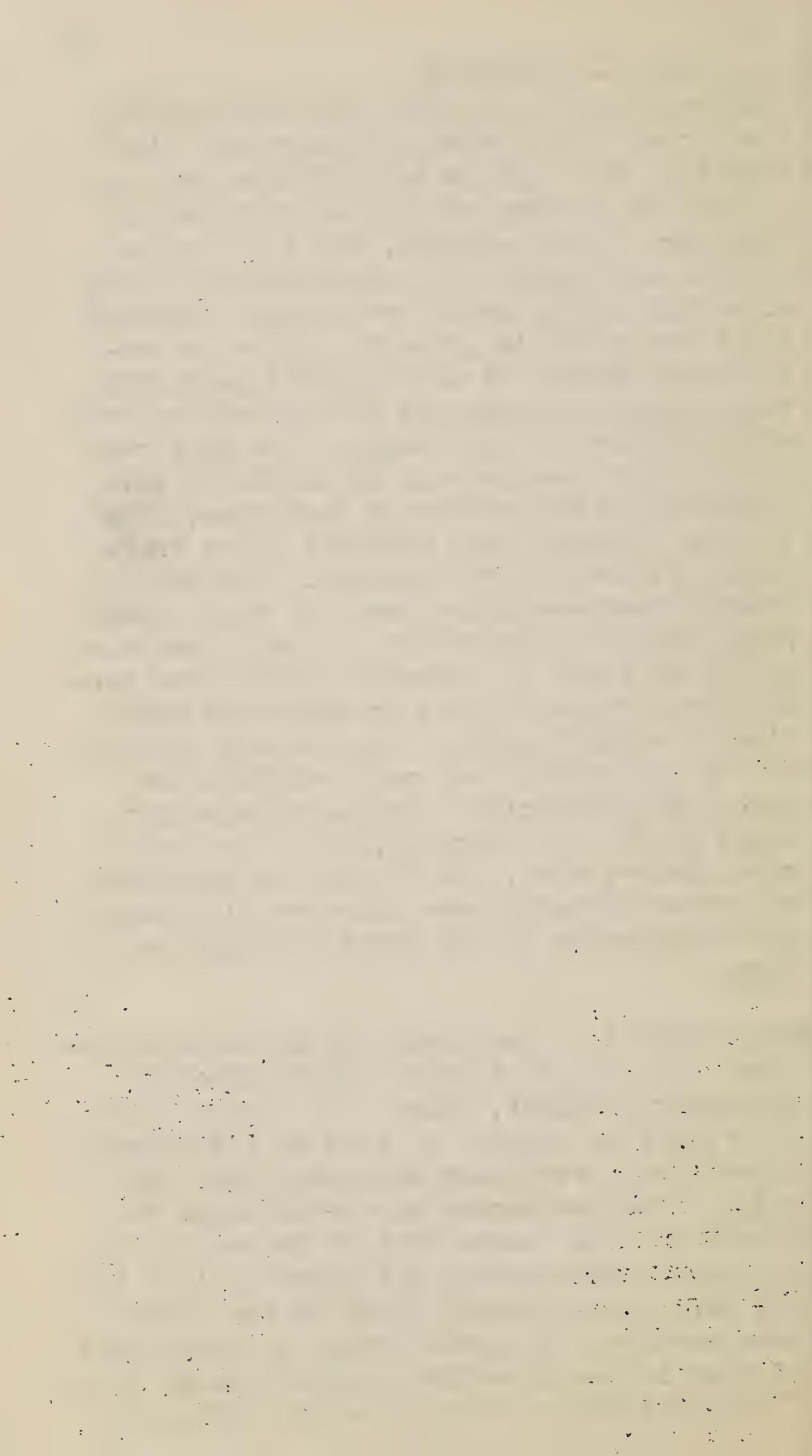
ROSS, JOHN F. Farm superintendent, Grain Investigations. Engaged in grain experiments in the Texas Panhandle. Work is being conducted in cooperation with the State experi-



Ross, John F.--Continued.

ment station, at Amarillo and Chillicothe, the former point being headquarters. The object of the work is to determine what can be done in the way of crop cultivation in that part of the country, but the results will be applicable to a considerably larger area than merely northwest Texas. Although chief attention is given to grains, a considerable amount of experimental work with other crops is conducted in cooperation with other offices of the Bureau. The work consists almost exclusively in trials of different crops and different varieties, with the aim of developing distinct types thoroughly fitted to the locality. The whole country has heretofore been one vast cattle range with no cultivation of crops whatever, and it is hoped to introduce grains and forage crops which will be an important addition to stock feeding. Experiments in methods of cultivation and crop rotation are also being conducted. Expenses this year, about \$4,500, of which \$2,500 is for salaries, labor, etc., and \$2,000 for traveling and other miscellaneous expenses, including the maintenance of the Amarillo Experiment Farm.

RYDER, FRANK J. Assistant, Grain Standardization. In charge of grain standardization laboratory, Duluth, Minn. The work at this laboratory is similar to that at the Chicago laboratory, previously described (see Carroll). The laboratory was established at Duluth for the reason that it is one of the principal distributing and export points for the hard spring wheats grown in the Northwest section. A special study is being made of what is known as the dockage system, i.e., fixing the amount of weed seeds, dirt, and



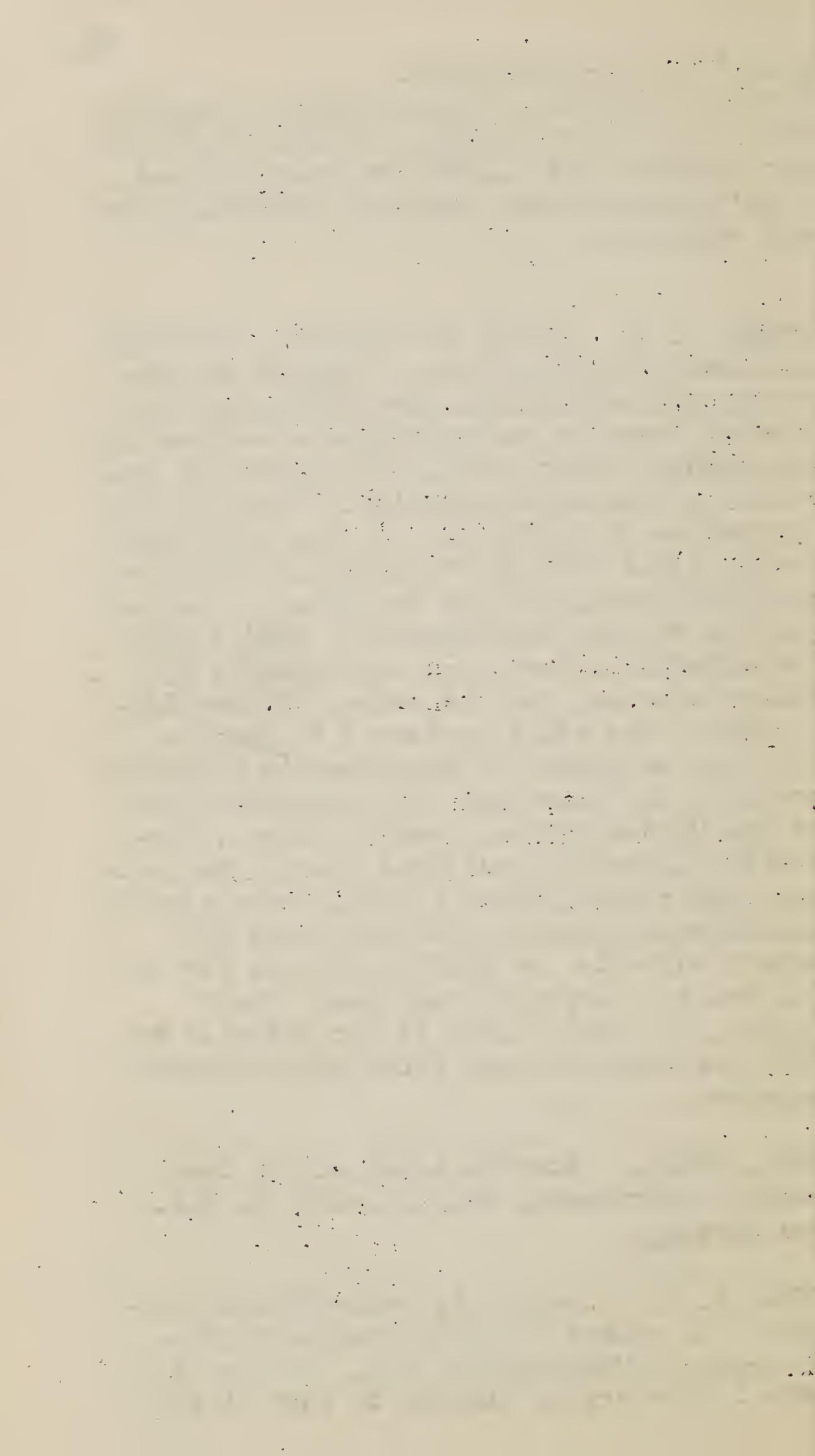
Pyder, Frank J.---Continued.

foreign material in these wheats. Expenses this year, about \$4,300, of which \$2,800 is for salaries and \$1,500 for traveling and other miscellaneous expenses, including rent and equipment.

SAFFORD, W. E. Assistant curator, Taxonomic and Range Investigations. Engaged in preparing for publication the information regarding American economic plants secured by Dr. Edward Palmer during forty years of travel as a botanical collector. The work is carried on at Washington, D. C., with incidental field work in Utah, Arizona, California, New Mexico, and also in Mexico. The object is to make available in a publication the valuable information contained in Dr. Palmer's notes, and the authentic identification of the plants referred to therein. The work embraces all the economic vegetable products of Mexico and the adjacent regions of the United States, such as fibers, dye-stuffs, tan-stuffs, medicinal plants, gums, balsams and resins, rubber plants, forage plants, sand-binders, useful woods, and trees and shrubs suitable as grafting stocks for useful fruits. Expenses this year, about \$2,000, of which \$1,800 is for salaries and \$200 for traveling and other miscellaneous expenses.

SALMON, CECIL. Special agent in dry land cereal experiments, Bellefourche, S. Dak. See Jardine.

SATTRE, A. M. Assistant, Grain Standardization, In charge of grain standardization laboratory, Minneapolis, Minn. The work at this laboratory is similar to that at the



SATRE, A. M.—Continued.

Chicago laboratory (see Carroll), and the objects of its establishment are similar to those of the Duluth laboratory (see Ryder). Expenses this year, about \$3,800, of which \$2,500 is for salaries and \$1,300 for traveling and other miscellaneous expenses, including rent and equipment.

SAUNDERS, D. A. Special agent, Cotton Breeding Investigations. Engaged in breeding cottons for northeastern and southern Texas and for Louisiana; also in the production of drought-resistant corn. Work is being conducted at "Lace, Denison, Wichita Falls, Marshall, McLean, Smithville, Bartlett, and Cuero, Tex.; and at Shreveport, La. Cooperation with the Texas Experiment Station is in effect. The work consists of the breeding of long-staple Upland cottons and also of short-staple varieties with an earlier season than the native sorts. The chief object of the work is to secure varieties which may be grown in the presence of the cotton boll weevil. Breeding and hybridization work to produce a more drought-resistant corn than the varieties now grown in the South is also being carried on. Variety tests of both cotton and corn are a feature of the work. Several valuable cotton hybrids have been secured and distributed to growers for trial. Expenses this year, about \$6,000, of which \$3,000 is for salaries and \$3,000 for traveling and other miscellaneous expenses.

SAVELY, H. E. Special agent and general assistant, Farmers' Cooperative Demonstration Work. See Knapp, S. A.



SAYLOR, CHARLES F. Special agent, Sugar Beet Investigations. Engaged in investigations of beet sugar production, with headquarters at Des Moines, Iowa. This work is related to the other lines of sugar beet work conducted by the Bureau (see Townsend; also Tracy, J. E. W.). The objects are to ascertain the progress of the beet sugar industry in the United States; to develop the domestic production of sugar from beets; and to obtain knowledge of the best methods of increasing the tonnage of sugar beets. A report is submitted annually to the Secretary of Agriculture, and is published both as a Departmental and a Congressional document. Expenses this year in these investigations, about \$5,500, of which \$4,000 is for salaries and \$1,500 for traveling and other miscellaneous expenses.

SCHMITZ, NOCKOLAS. Expert in alfalfa experiments, Forage Crop Investigations. See Westgate.

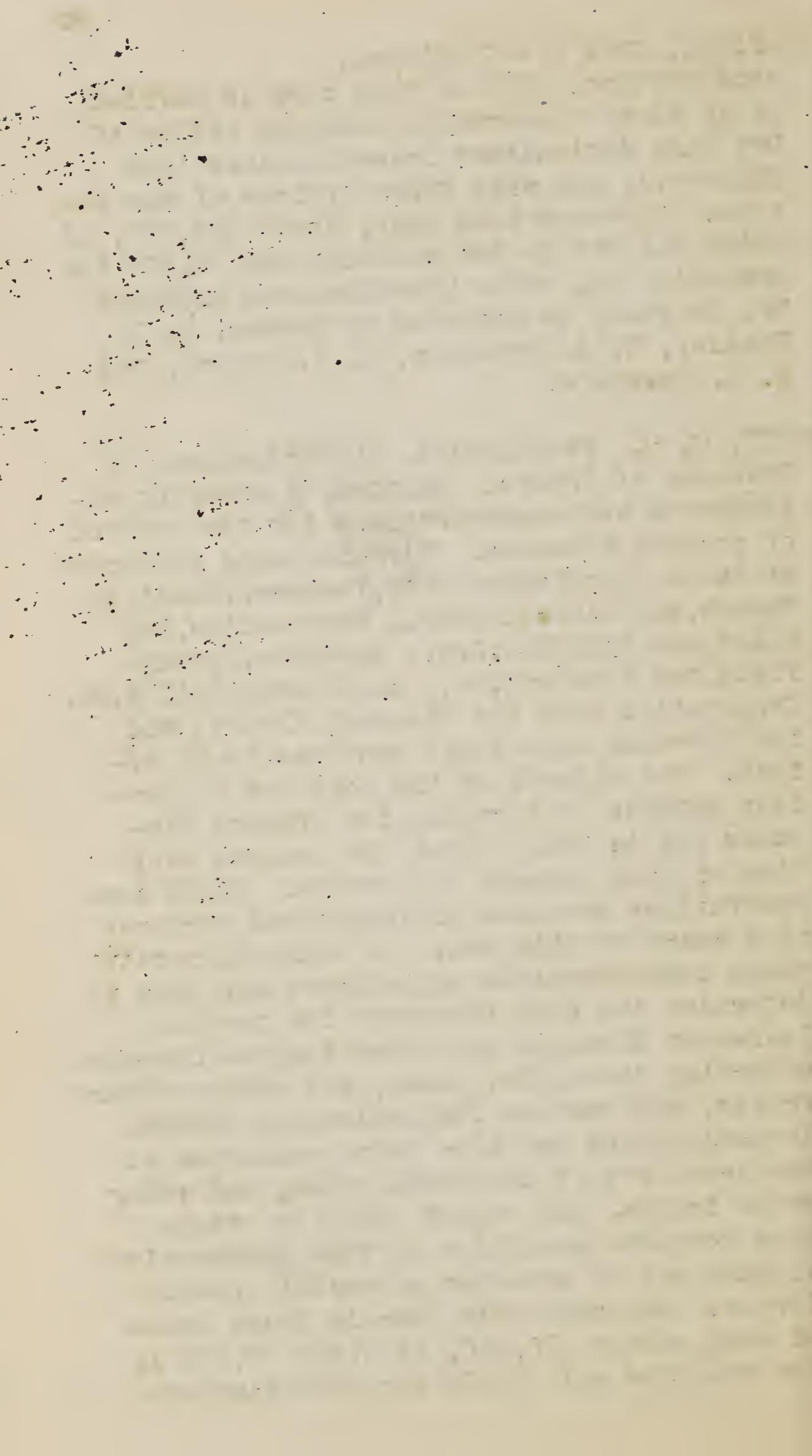
SCOFIELD, CARL S. Agriculturist in charge of Western Agricultural Extension. Work is being conducted at Yuma, Ariz.; Fallon, Nev.; Belle Fourche, S. Dak.; and San Antonio, Tex. At the two first-named points cooperation with the U. S. Reclamation Service is practiced. The object of the work is the extension of profitable agriculture into regions now unproductive. Trials of a large number of crops to ascertain those best suited to each region are being made. At San Antonio, Tex., the work has a special bearing on the boll weevil problem, the practicability of growing other crops in this region in rotation with cotton being demonstrated, as well as proper methods of tillage and of moisture



Scofield, Carl S.—Continued.

conservation. All of this work is carried on in close cooperation with the office of Dry Land Agriculture Investigations (see Chilcott), and with other offices of the Bureau. Expenses this year, about \$24,500, of which \$15,000 is for salaries and \$9,500 for traveling and other miscellaneous expenses. Mr. Scofield is assisted by Messrs. F. B. Headley, W. A. Peterson, S. J. Rogers, and S. H. Hastings.

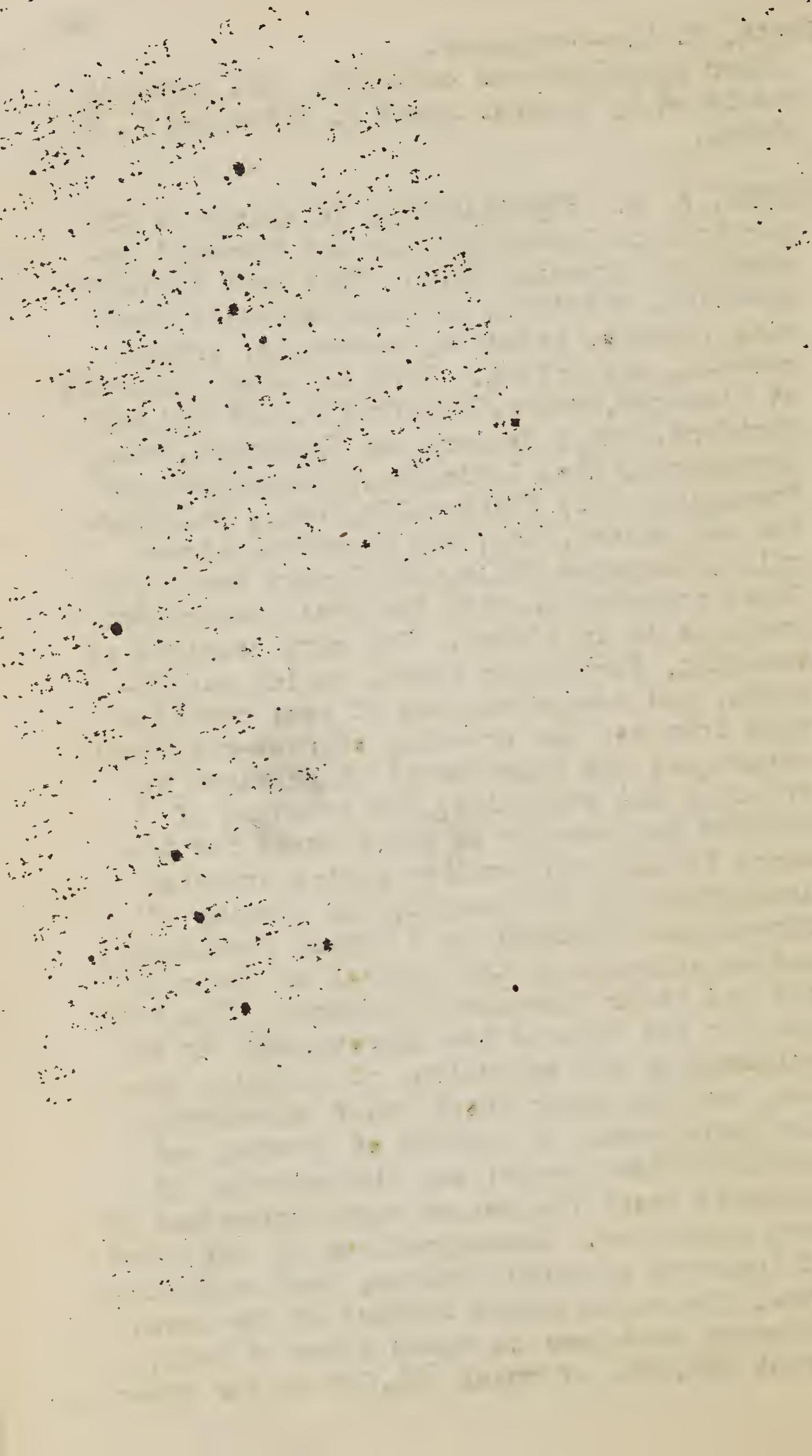
SCOTT, W. M. Pathologist, Investigations of Diseases of Fruits. Engaged in spraying experiments and demonstrations for the control of orchard diseases. Work is being conducted at Falls City, Pawnee City, Tecumseh, Unadilla, Wabash, and Lincoln, Nebr.; Bentonville, Pea Ridge, and Highfill, Ark.; Anderson, Springfield, and Fordland, Mo.; and Marshallville, Ga. Cooperation with the Missouri (Fruit) and the Nebraska experiment stations is in effect. The objects of the work are to perfect methods of spraying for orchard diseases and to bring about the general adoption of such methods by growers. Field demonstrations are made in individual orchards as a means to this end. In connection with these demonstrations experiments are made to determine the best treatment for certain leaf-spot diseases and other fungous diseases affecting the apple, peach, and other orchard fruits, and various fungicides are tested. Investigations are also being conducted on the brown rot of the peach, plum, and other stone fruits, the object being to obtain more complete knowledge of this destructive disease and to discover a specific remedy for it. Expenses this year in these lines of work, about \$10,000, of which \$7,500 is for salaries and \$2,500 for traveling and



Scott, W. M.--Continued.

other miscellaneous expenses. Mr. Scott is assisted by Messrs. James B. Rorer and T. W. Ayres.

SHAMEL, A. D. Physiologist, in charge of Cigar Tobacco Investigations and Farmers' Cooperative Breeding Work. This work includes breeding, rotation, and demonstration work with tobacco, potatoes, asparagus, vetch, cereals, and cotton. Work is being conducted at Hockanum, Granby, Tariffville, Suffield, and Hartford, Conn.; Concord and Southwick, Mass.; Germantown, Ohio; Lexington, Hopkinsville, and Farmington, Ky.; Clarksville, Tenn.; Tallahassee and Quincy, Fla.; and Hoschton, Gainesville, Thompsons Mills, and Flowery Branch, Ga. Close cooperation with the State experiment stations is in effect. The work consists of breeding, fertilizer tests, curing experiments, and demonstrations of crop rotation with tobacco; the breeding of rust-resistant asparagus; the improvement of potatoes by breeding and selection; the breeding of vetches and cereals as cover crops for tobacco fields; cooperative cotton breeding demonstrations in Georgia; the testing of fine-ground feldspar as a potash fertilizer; and experiments in the control of the root-rot and other diseases of tobacco. The work has for its objects the improvement, by hybridization and selection, of tobacco, cotton, and the other crops under experiment; the improvement of methods of growing and handling these crops; and the securing of suitable crops for use as cover crops and in crop rotations. Demonstrations of the value of improved cultural methods, seed selection, etc., are an important feature of the work. Expenses this year in these lines of work, about \$20,000, of which \$12,000 is for sala-



Shamel, A. D.—Continued.

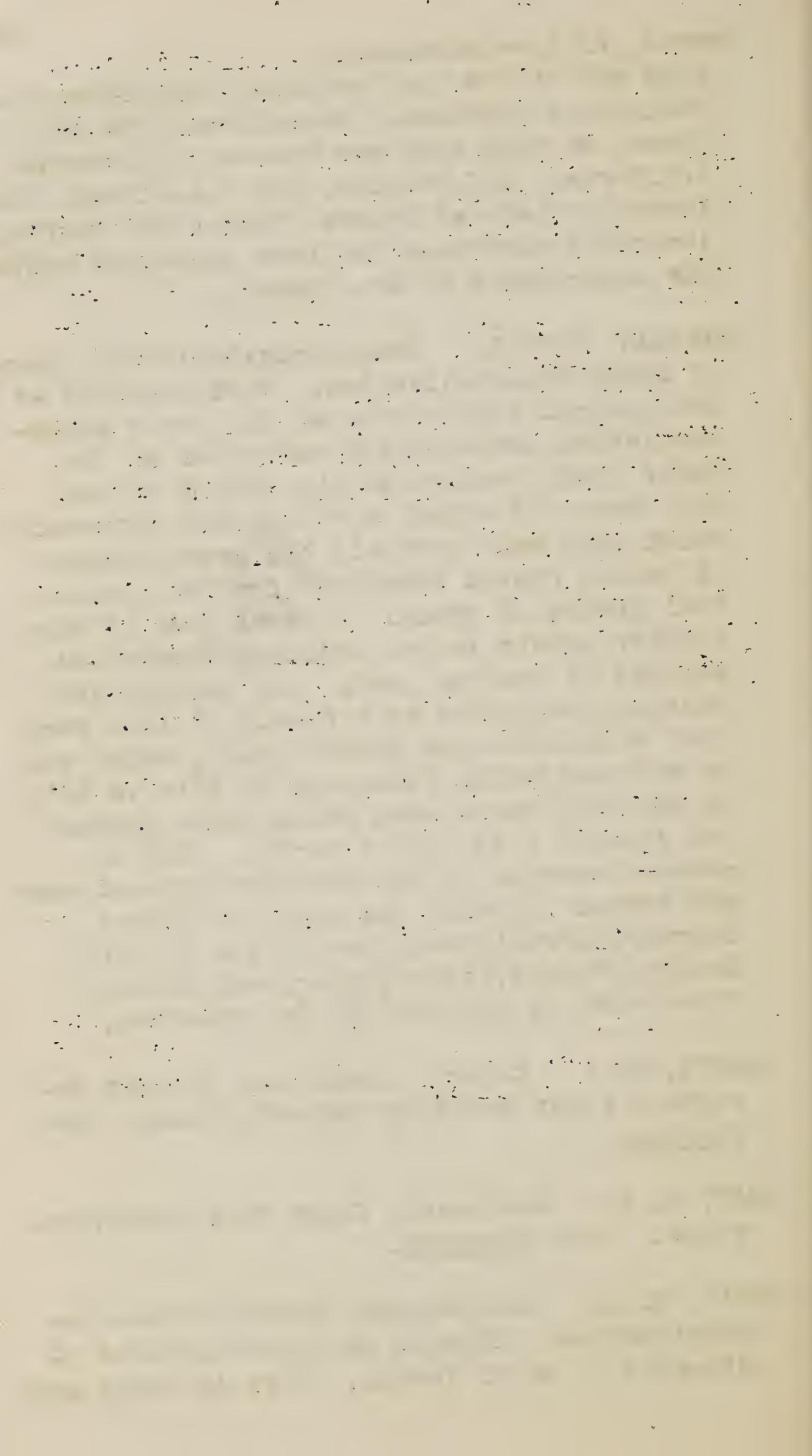
ries and \$8,000 for traveling and other miscellaneous expenses. Associated with Mr. Shamel in this work are Messrs. J. B. Stewart, J. B. Norton, H. C. Woosley, and H. A. Allard. The investigations of Messrs. Hinson and Harris, described elsewhere in these pages, are under the supervision of Mr. Shamel.

SHANAHAN, JOHN D. Crop technologist in charge of Grain Standardization. Work consists of the general supervision of the grain standardization laboratories conducted at the chief grain centers of the United States, the object of which is to collect information which will make possible the establishment of United States standards for the commercial grades of grain. A great lack of uniformity exists in the ordinary commercial methods of grading grain, and dealers are becoming convinced as a result of this work that a definite and honest grade, which can be mathematically fixed and is fair to all, is the only basis upon which grain grading can finally rest with security. The expenses incurred in the work the present year are stated opposite the names of Messrs. Boerner, Carroll, Duval, Duval, Fitz, Jeffers, Leighty, Morris, Richoy, Ryder, and Sattre, whose work is directed by Mr. Shanahan.

SHANTZ, H. L. Expert, Alkali and Drought Resistant Plant Breeding Investigations. See Kearney.

SHAW, H. B. Assistant, Sugar Beet Investigations. See Townsend.

SHEAR, C. L. Pathologist, Fruit Disease Investigations. Engaged in investigations of diseases of small fruits. Work is being done

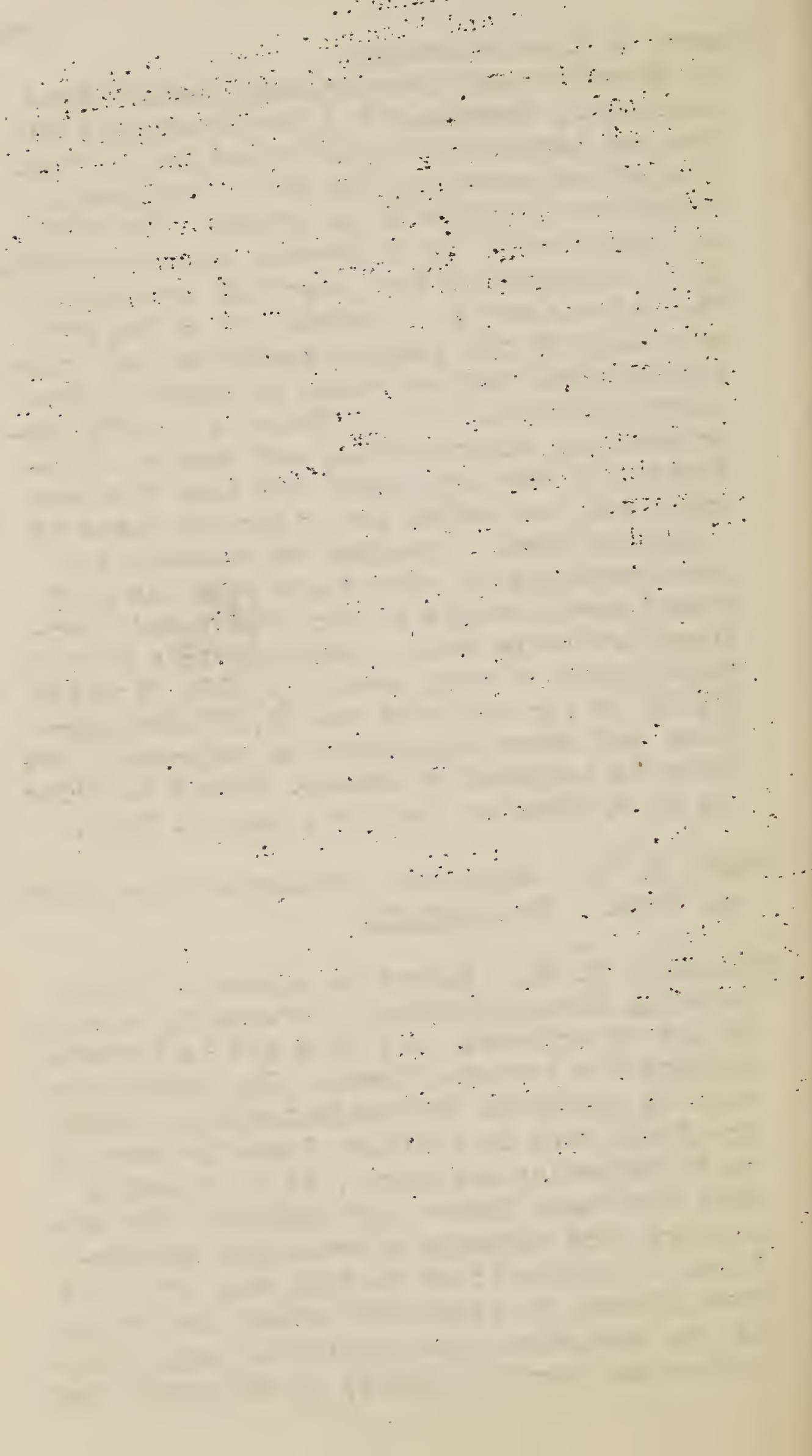


Shear, C. L.--Continued.

at Brewster and Pleasant Lake, Mass.; Vineland, N.J.; Kendal, N.Y.; Northeast, Pa.; Paw Paw and Lawton, Mich.; and Grand Rapids, Wis. Nominal cooperation with the Pennsylvania Experiment Station is in effect. The work on small fruits is at present devoted chiefly to diseases of the grape and cranberry. The objects are the securing of a complete knowledge of the fungous parasites and other pathological factors which produce the diseases, especially the methods of growth, reproduction, distribution, and manner of infection of the organisms, and also the most practical, economic, and effective means of combating them. Spraying experiments and demonstrations in accordance with the most recent developments in fungicides and machinery are being made. Expenses this year in these lines of work, about \$9,000, of which \$7,000 is for salaries and \$2,000 for traveling and other miscellaneous expenses. Dr. Shear is assisted by Messrs. George F. Miles and L. A. Hawkins, and Mrs. Anna K. Wood.

SHEAR, W. V. Assistant, Arlington Experimental Farm. See Corbett.

SHOEMAKER, D. N. Expert in charge of Cotton Breeding Investigations. Personally engaged in laboratory work on cotton and in breeding cottons for northern Texas. The laboratory work is conducted at Washington, D.C., while the field work in northern Texas is carried on at Palestine and Paris, in cooperation with the Texas Experiment Station. The laboratory work includes microscopic examinations of cotton fiber to find the origin of weak fibers; to learn the nature and extent of gin damage and the conditions under which cotton can best be ginned; to ascertain what



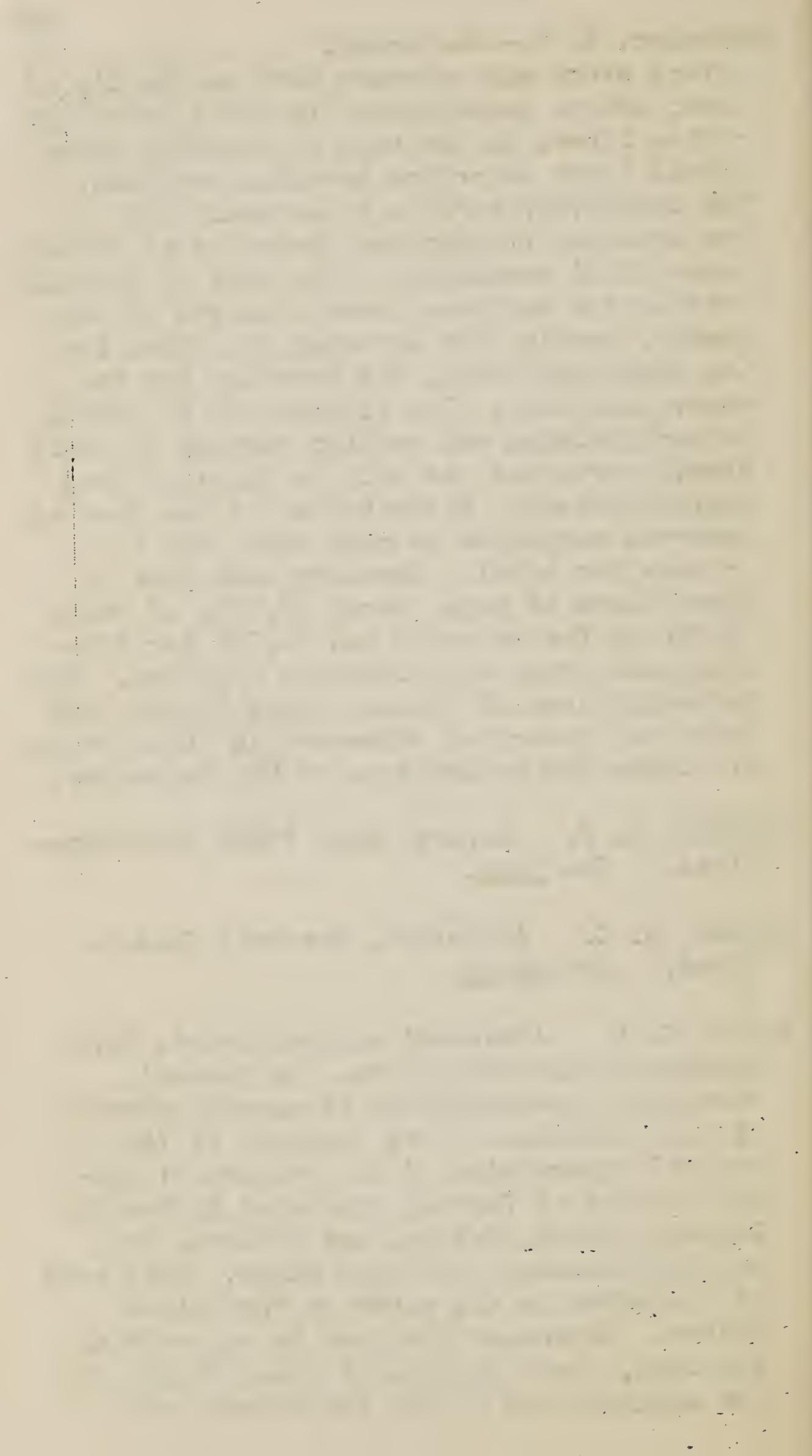
Shoemaker, D. N.--Continued.

effect storm and exposure have on quality of lint; and to investigate the early growth of cotton fiber, in the hope of throwing additional light on cotton breeding problems. The laboratory work is a necessary aid to the breeding of improved varieties of cotton under field conditions. The work of breeding cottons for northern Texas consists of two phases, namely, the breeding of cotton for the black land belt, and breeding for the sandy land belt. The objects are to obtain better yielding and earlier strains of short staple varieties, as well as improved long staple cottons. Distribution of the seed of improved varieties is made each year to growers for trial. Expenses this year in these lines of work, about \$3,000, of which \$2,000 is for salaries and \$1,000 for traveling and other miscellaneous expenses. The investigations of Messrs. Bain, Boykin, and Saunders, described elsewhere in these pages, are under the supervision of Dr. Shoemaker.

SIEVERS, A. F. Expert, Drug Plant Investigations. See True.

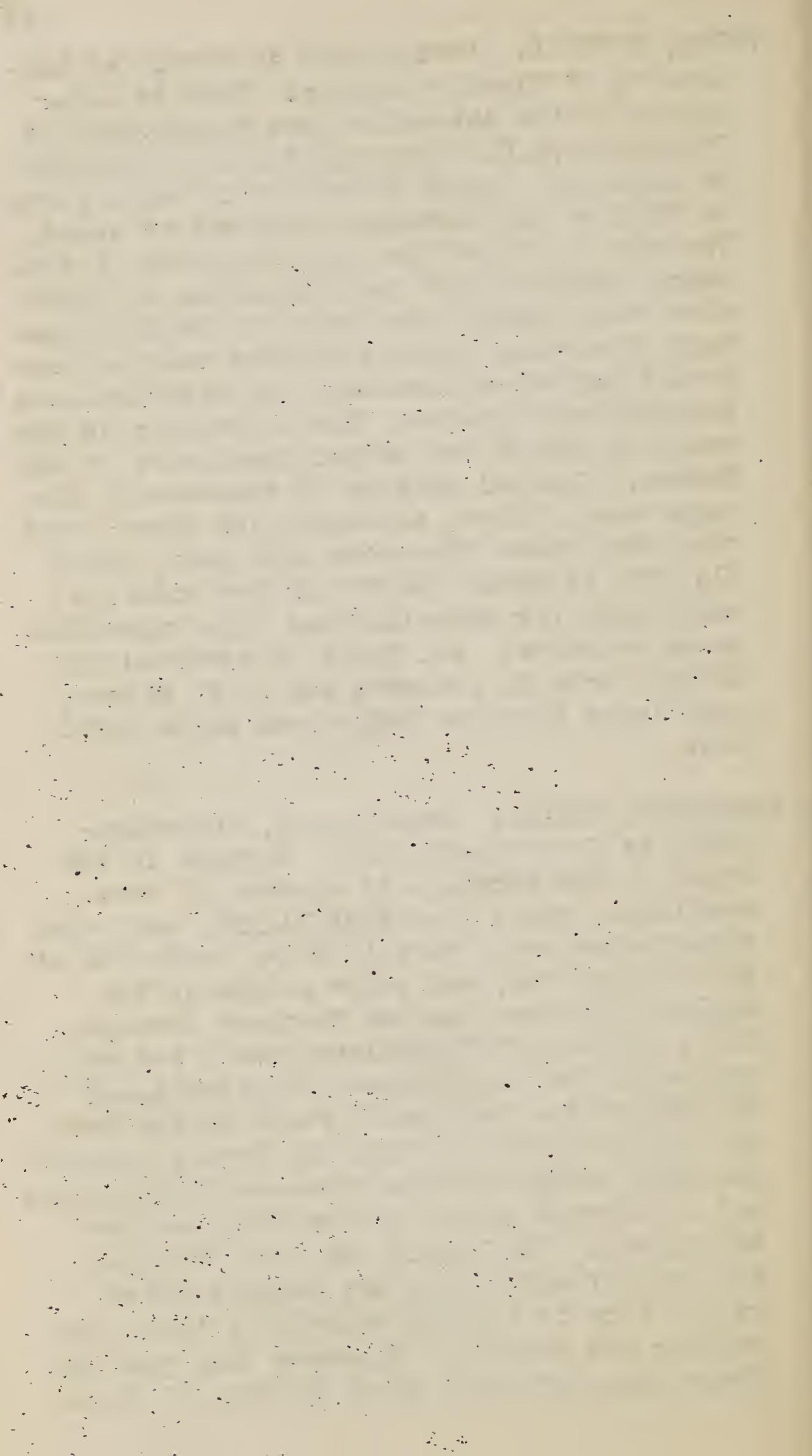
SKEELS, H. C. Assistant, Economic Collections. See Wight.

SMITH, C. B. Assistant agriculturist, Farm Management Investigations. In general charge of investigations of special phases of farm practice. Work consists of the general supervision of the studies of special phases of farming conducted by Messrs. Beavers, Cates, Cotton, and McClure, described elsewhere in these pages. This work is conducted in all parts of the United States. Expenses this year in supervising the work, about \$5,500, of which \$4,500 is for salaries and \$1,000 for travel, etc.



SMITH, ERWIN F. Pathologist in charge of Laboratory of Plant Pathology. Work is conducted in the laboratory and greenhouses at Washington, D. C., with incidental field work as required. Chief attention is being given to fungous and bacterial diseases of crops. The work includes the identification of diseased specimens and the suggestion of remedies where known; the study of the life history of various plant parasites causing bacterial and other diseases; and miscellaneous pathological studies. The laboratory is the basis of all of the pathological work of the Bureau. Special studies of diseases of the sugar cane, olive, cocoanut, and other crops are being made. Expenses this year, about \$19,000, of which \$14,000 is for salaries and \$5,000 for traveling and other miscellaneous expenses. Dr. Smith is assisted by Messrs. John R. Johnston and J. F. Brewer, and Misses Florence Hedges and Lucia McCulloch.

SPAULDING, PERLEY. Pathologist, Investigations in Forest Pathology. Engaged in the study of the damping-off disease of tree seedlings, white pine leaf blight, and other forest diseases. Work is being conducted at Burlington, Vt., and other points in New England; Saranac Inn and Westbury Station, N. Y.; Biltmore, N. C.; Halsey, Nebr.; and at points in New Mexico, Idaho, California, and throughout the National Forests in the West, in close cooperation with the Forest Service. The work covers various diseases of deciduous and coniferous trees, forest tree nursery stock, etc. The blight and leaf dropping diseases of white pine are being studied with a view to finding methods of their prevention and control. Expenses this year in these lines of work, about \$2,750, of which



Spaulding, Perley—Continued.

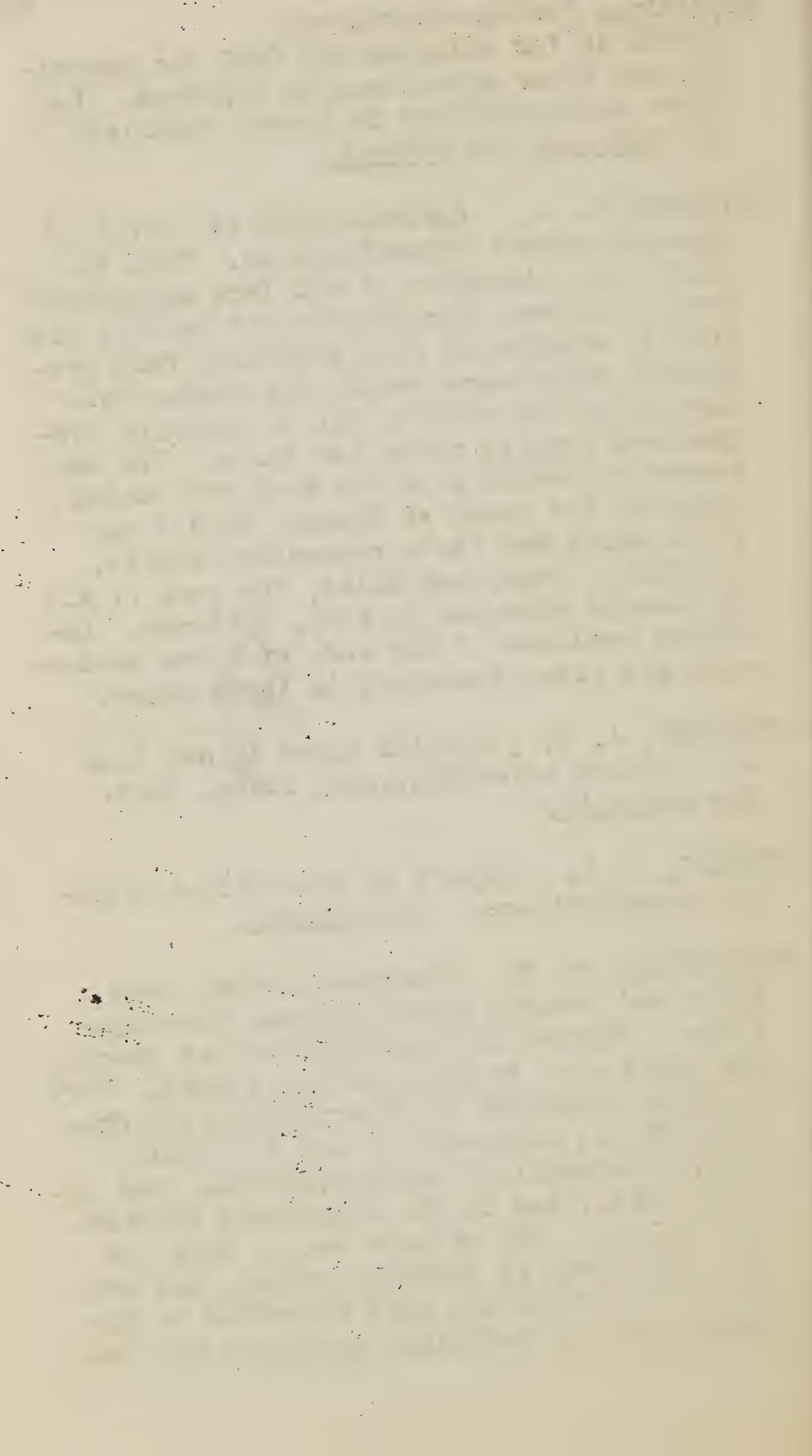
\$1,800 is for salaries and \$950 for traveling and other miscellaneous expenses. For other investigations in Forest Pathology see Hedgcock and Metcalf.

SPILLMAN, W. J. Agriculturist in charge of Farm Management Investigations. Work includes the direction of all farm management investigations, farm management work by districts, studies of farm practice, farm economics, range management, and cactus culture; also the working out of cropping systems and general plans for farms. The expenses connected with the work are stated opposite the names of Messrs. Bracie and C. B. Smith and their respective staffs, Griffiths, Peck, and Ellis, the work of all of whom is directed by Prof. Spillman. Detailed outlines of the work of these assistants are given elsewhere in these pages.

STEPHENS, J. M. Special agent in dry land agriculture investigations, Utica, N.Y. See Chilcott.

STEWART, J. B. Expert in Connecticut tobacco investigations. See Shamel.

STOCKBERGER, W. W. Pharmacognosist, Drug Plant and General Physiological Investigations. Engaged in investigations of American hops; also tanning and dye plants. Work is being conducted at Waterville, N.Y.; Chehalis, Wash.; Independence and Reedville, Oreg.; Pleasanton, Wheatland, Perkins, and Consumne, Cal.; and in the laboratory at Washington, D.C. The objects are to work out the conditions of growing, curing, and handling hops which are most favorable to the development of desirable qualities and con-

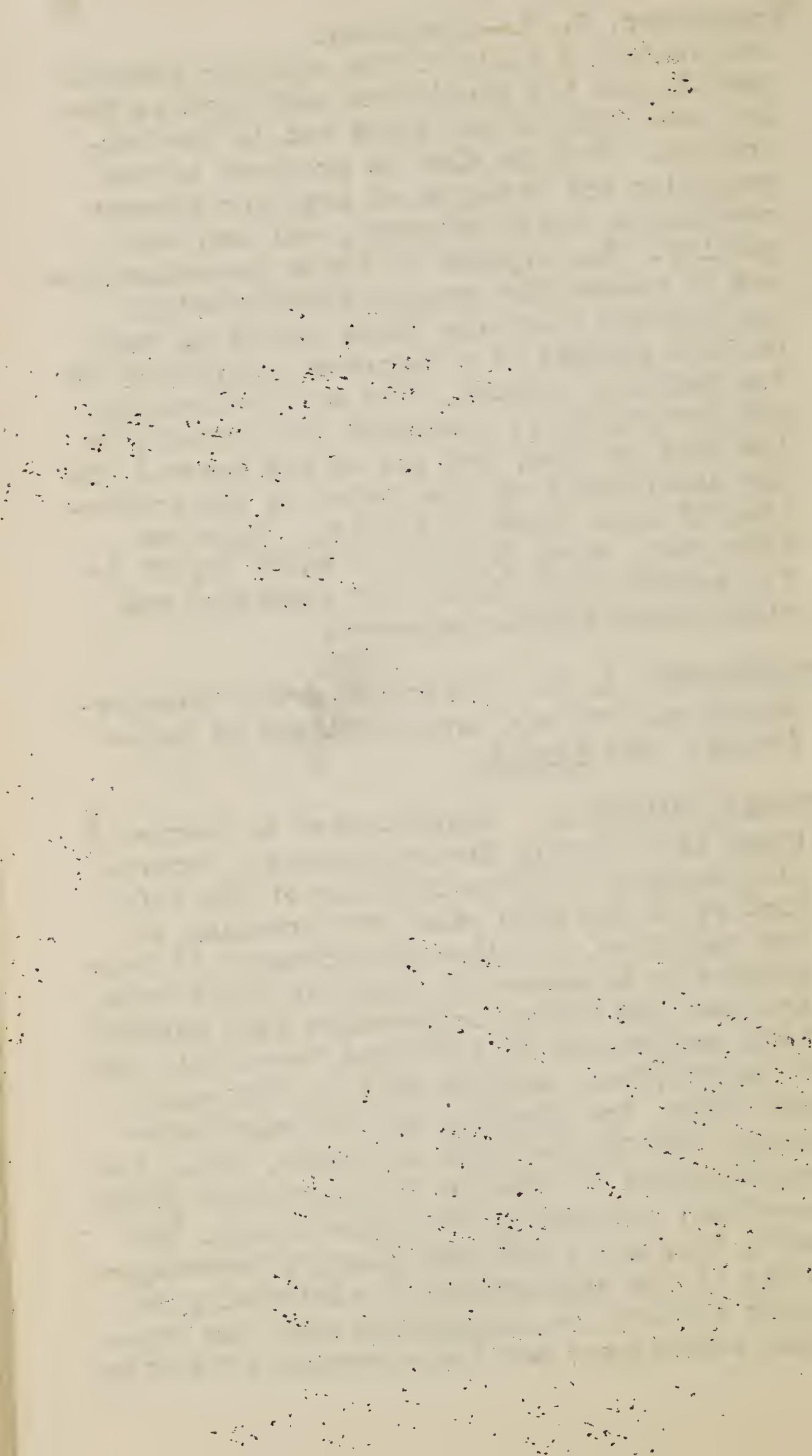


Stockberger, W. W.--Continued.

stituents. A study of the relation between quality and the conditions mentioned is being made both in the field and in the laboratory. Work is also in progress in the selection and breeding of hops for disease resistance, early maturity, and improved quality. The objects of these investigations are to remove the present discrimination against American hops which exists in many markets because of a supposed inferiority of the American product. The work on tanning and dye plants is conducted incidentally to the work on hops, and has as its general aim the development of industries in the production of this class of plants. Expenses this year, about \$5,000, of which \$3,500 is for salaries and \$1,500 for traveling and other miscellaneous expenses.

STUBENRAUCH, A. V. Expert in fruit transportation and storage investigations in California. See Powell.

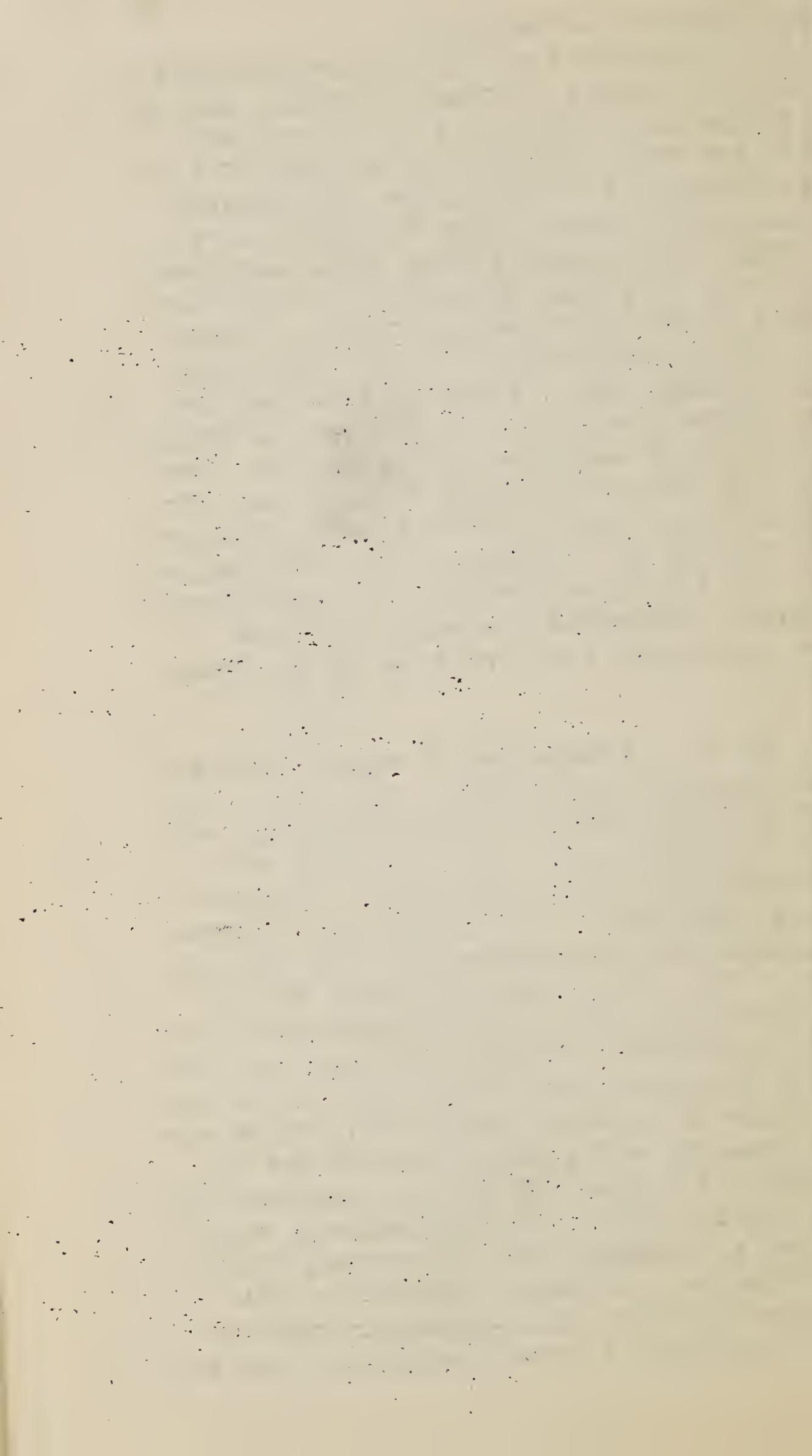
SWINGLE, WALTER T. Physiologist in charge of Plant Life History Investigations. Personally engaged in investigations of the life history of the date palm, the breeding of new varieties, and the establishment of date culture on a commercial scale in California, Arizona, and Texas, cooperative date gardens being maintained at Indio and Mecca, Cal., and at Laredo, Tex.; similar work on figs and caprifigs, the pistache and its wild relatives, the Chinese date or jujube, etc.; investigations of methods of cooperative plant breeding, especially of citrus fruits, the date, fig, and other crop plants; investigations of the application of electricity to plant culture, in cooperation with the Physical Laboratory; and the operation of testing



Swingle, Walter T.—Continued.

and demonstration farms in cooperation with the Indian Service at Sacaton, Ariz., and on the Indian Reservations of the Southwest, having for their objects the testing of new crops suitable for culture by the Indians and educating Indian labor to handle cotton and other crops grown by the white settlers. All of the work just described is conducted chiefly in the Southwestern States. Breeding work on citrus fruits is carried on at Glen St. Mary, Fla. Expenses this year in these lines of work, about \$16,500, of which \$12,000 is for salaries and \$4,500 for traveling and other miscellaneous expenses. Mr. Swingle is assisted by Messrs. W. L. Flanery, E. M. Savage, E. W. Hudson, and Bruce Drummond; and the investigations of Messrs. Brand and Mason, described elsewhere in these pages, are under the direction of Mr. Swingle.

TAYLOR, WM. A. Pomologist in charge of Field Investigations in Pomology. Personally engaged in fruit marketing investigations and pecan investigations. Work is being conducted at South Glastonbury, Conn.; Carlton Station and Ghent, N.Y.; Wyoming, Del.; Charlottesville and Winchester, Va.; Paw Paw and Keyser, W.Va.; Centralia, Ill.; Fort Valley and DeWitt, Ga.; and Orange Heights and other points in Florida. The fruit marketing work has for its object the development of an export trade in peaches, summer and winter apples, pomelos, and pineapples; and the improvement of methods of packing and handling these fruits, with a view to insuring their delivery to consumers in attractive, sound, and wholesome condition, especially with reference to their trans-Atlantic exportation. The work is closely allied to and in



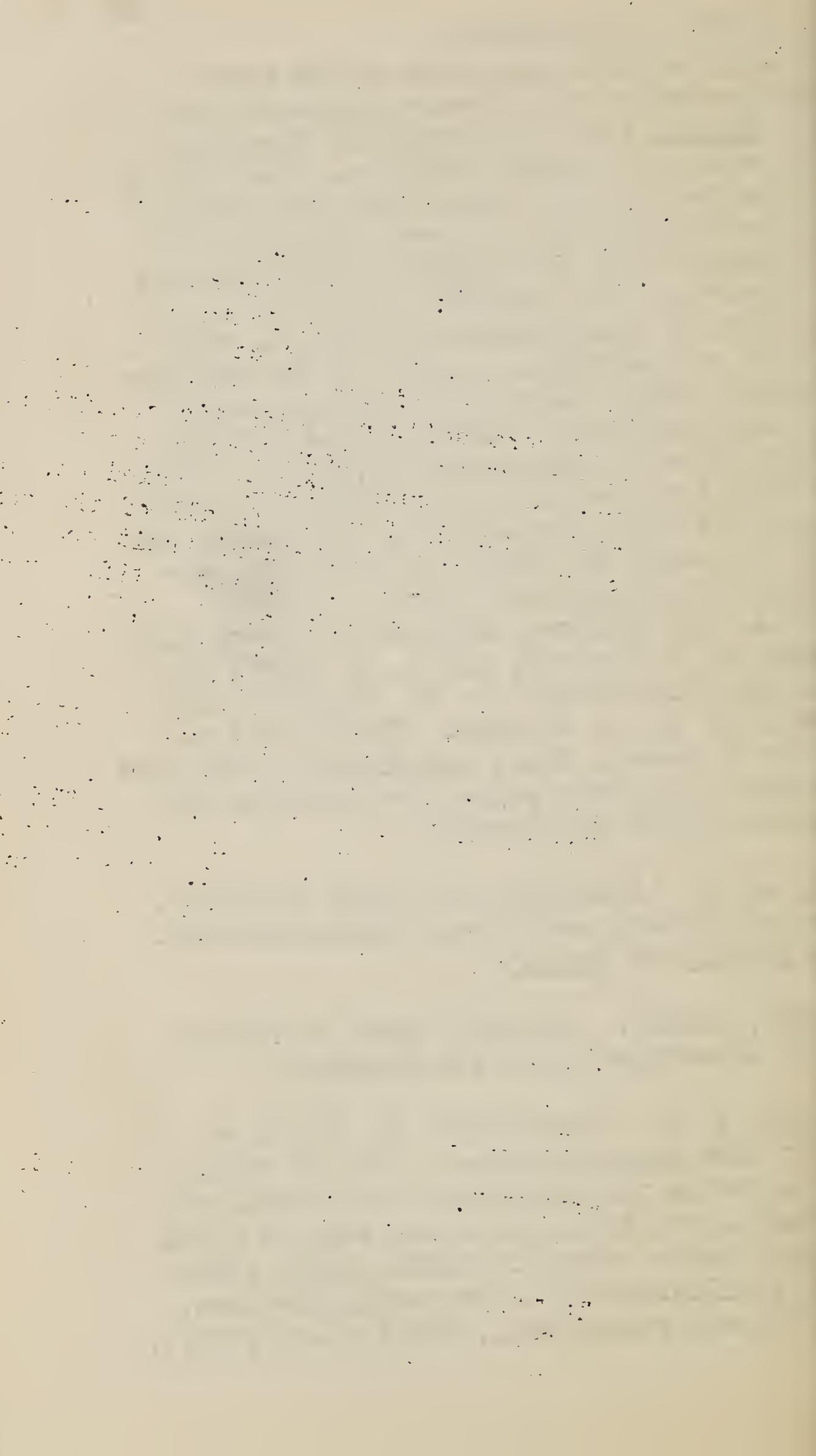
Taylor, Wm. A. --Continued.

certain respects dependent on the fruit transportation and storage investigations (see Powell); and the Bureau of Chemistry cooperates on certain features. The work on pecans has for its object the determination of the adaptability of pecan varieties to different soils and climatic conditions and to ascertain the locations where pecan culture can be successfully carried on, especially in the South. In all of the work co-operation with individual fruit growers is largely practiced. Expenses this year in these lines of work, about \$9,000, of which \$5,000 is for salaries and \$4,000 for traveling and other miscellaneous expenses. Associated with Mr. Taylor in the fruit marketing investigations is Mr. G. Harold Powell, and they are assisted by Messrs. L. S. Tenny, G. W. Hosford, and H. M. White. In the pecan investigations Mr. Taylor is assisted by Mr. C. A. Reed. The investigations of Messrs. Gould and Husmann, described elsewhere in these pages, are directed by Messrs. Taylor and Powell.

TENNY, L. S. Pomologist in fruit marketing, transportation, and storage investigations. See Powell and Taylor.

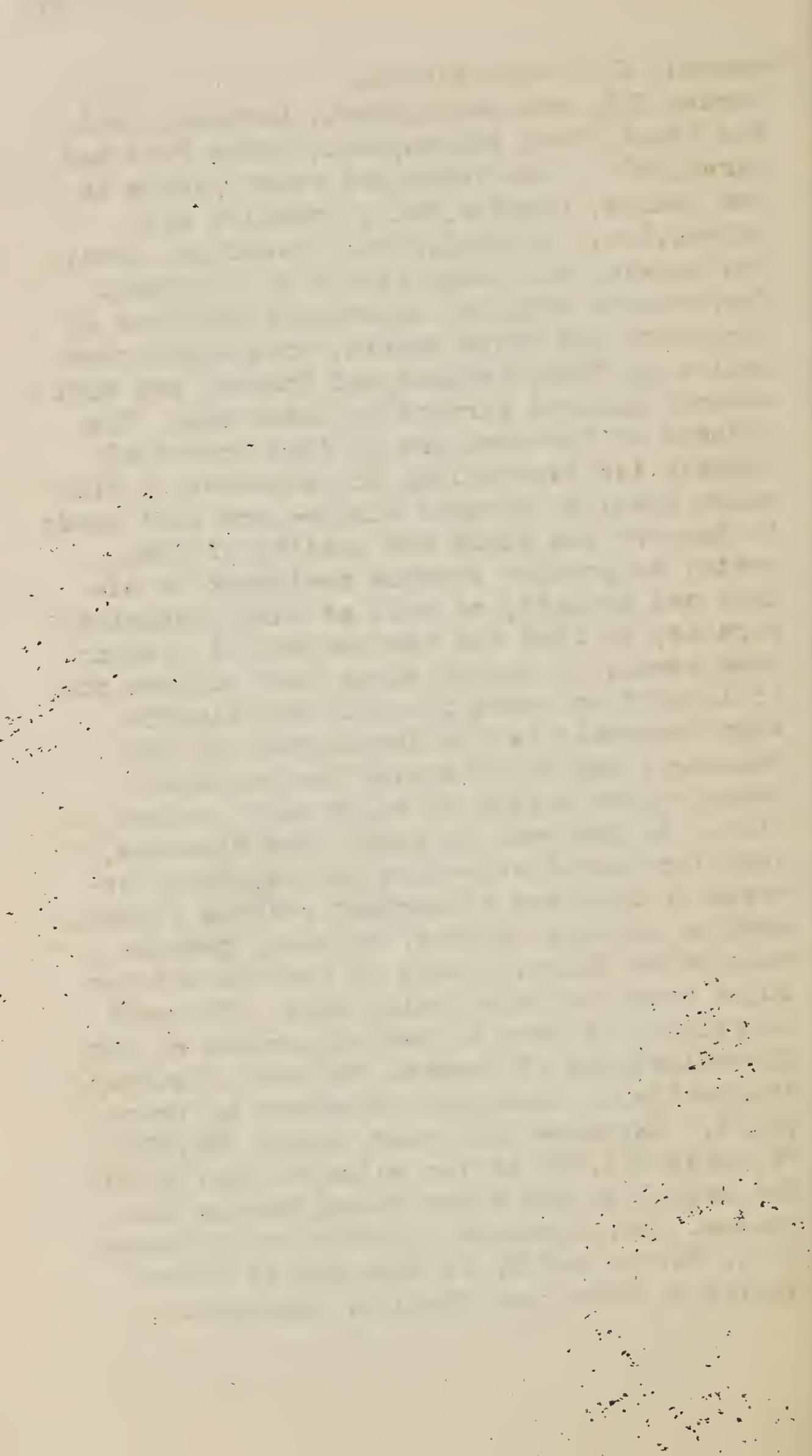
TOURNIER, ALFRED. Special agent in viticultural investigations. See Husmann.

TOWNSEND, C. O. Pathologist in charge of Sugar Beet Investigations. Work is being conducted in the laboratory and greenhouse at Washington, D. C., and field work is being carried on at Fairfield, Wash.; Sugar City, Idaho; Billings, Mont.; Brookings, Aberdeen, and Bellefourche, S. Dak.; North Platte, Nebr.;



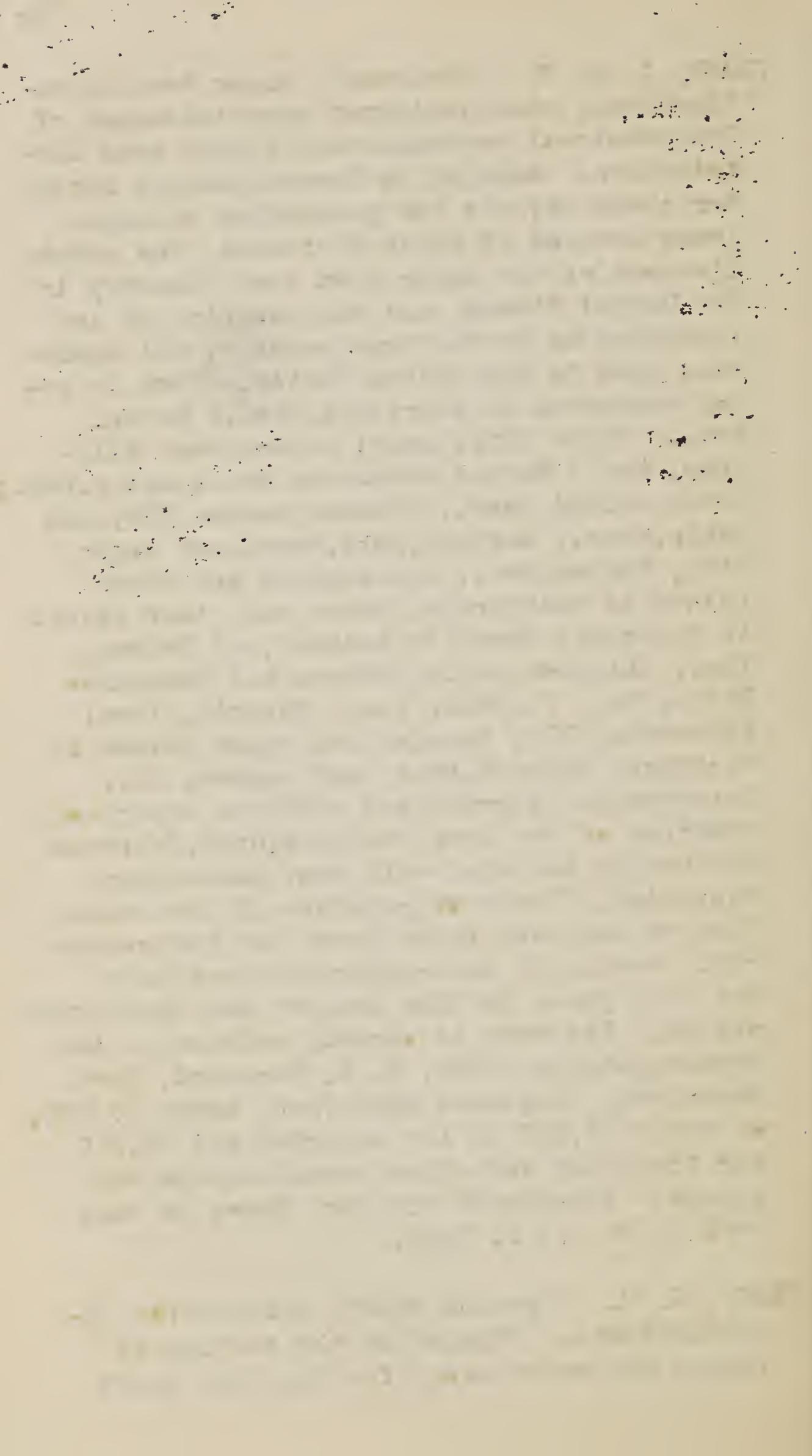
Townsend, C. O.—Continued.

Garden City and Lakin, Kans.; Garland, Lehi, and Nephi, Utah; Fallon, Nev.; Rocky Ford and Akron, Colo.; Las Vegas and other points in New Mexico; Compton, Cal.; Amarillo and McLean, Tex.; St. Paul, Minn.; Hazelton, Iowa; and Lansing and other points in Michigan. Cooperation with the experiment stations of Minnesota and South Dakota, with sugar companies in Utah, Michigan, and Kansas, and with several hundred farmers is under way. The objects of the work are to find practical methods for controlling the diseases of the sugar beet; to produce single-erm beet seed; to improve the yield and quality of the beets; to produce strains resistant to alkali and drought, as well as early maturing strains; to find the best method of siloing seed beets; to extend sugar beet culture into localities where the soil and climate seem favorable to the development of the industry; and to determine the cultural methods best suited to sugar beet production. In the work on sugar beet diseases, some incidental attention is also being devoted to diseases of various related plants, such as alfalfa, clover, spinach, and the cultivated daisy. Tests of fertilizers for sugar beets are also being made. The work is related in part to certain phases of the investigations of Messrs. Chilcott, Kearney, and Scofield, described elsewhere in these pages. Expenses this year, about \$20,000, of which \$11,000 is for salaries and \$9,000 for traveling and other miscellaneous expenses. Dr. Townsend is assisted by Messrs. E. C. Rittus and H. B. Shaw and by Misses Nellie A. Brown and Clara O. Jamieson.



TRACY, J. E. W. Assistant, Sugar Beet Investigations; also assistant superintendent of Congressional vegetable and flower seed distribution. Engaged in investigations having for their objects the production of high-grade strains of sugar beet seed, the establishment of the sugar beet seed industry in the United States, and the securing of information as to the true worth of all varieties used in the United States. Work is being conducted at Fairfield, Wash.; Union, Oreg.; Sugar City, Idaho; Bczeman and Billings, Mont.; Bellefourche and Brookings, S. Dak.; Grand Island, Nebr.; Ashland, Garden City, and Lakin, Kans.; Garland, Lehi, Nephi, and Logan, Utah; Fallon, Nev.; Los Angeles and other points in California; Akron and other points in Colorado; Amarillo, Dalhart, and McLean, Tex.; Chippewa Falls, Madison, and Menominee Falls, Wis.; St. Paul, Minn.; Waverly, Iowa; Riverdale, Ill.; Lansing and other points in Michigan; Fremont, Ohio; and Geneva, N.Y. Cooperation is practiced with the experiment stations of New York, Michigan, Utah, Colorado, and Oregon, and also with many beet-sugar factories. The work consists of the selection of the best roots grown and the commercial testing of the comparative merits of the seed grown in this country and that grown abroad. The work is closely related to the investigations of Dr. O. O. Townsend, just described. Expenses this year, about \$5,000, of which \$3,200 is for salaries and \$1,800 for traveling and other miscellaneous expenses. Associated with Mr. Tracy in this work is Mr. J. F. Reed.

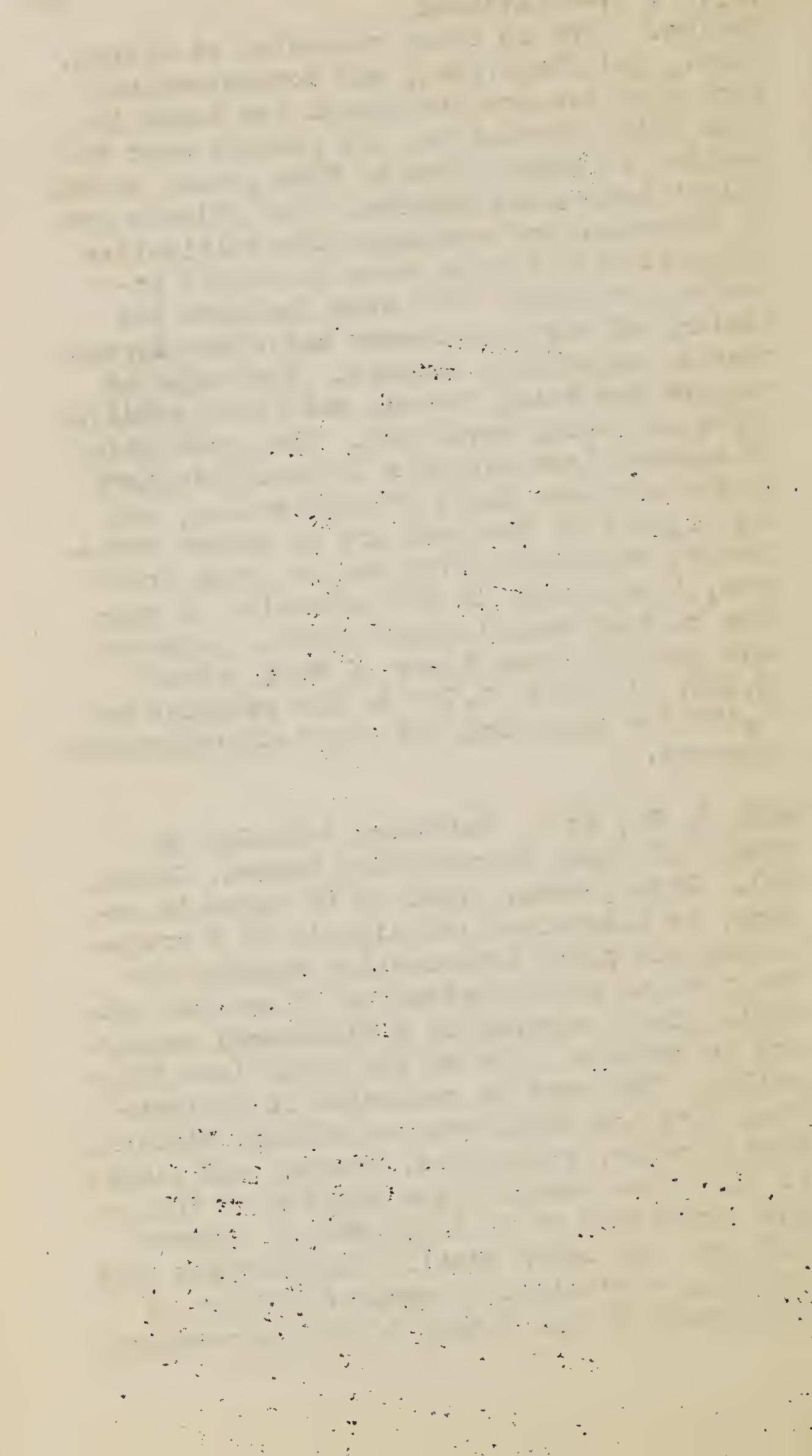
TRACY, S. M. Special agent, Forage Crop Investigations. Engaged in the testing of forage and cover crops for the Gulf coast



Tracy, S. M.—Continued.

region. Work is being conducted at Biloxi, Miss., and Miami, Fla.; and demonstration work with farmers throughout the South is also being carried on. At present much attention is being given to Para grass, vetch, velvet beans, and cassava. The objects are to introduce and encourage the cultivation of profitable forage crops in weevil infested districts. The work includes the testing of various grasses and other forage plants, especially legumes. Varieties of cassava are being tested, and fixed seedling types are being developed. The propagation of cassava from cuttings is unsatisfactory at the northern limit of cultivation, and the objects of the work are to secure satisfactory varieties which can be grown from seed, thus aiding in the extension of cassava culture much farther north. Expenses this year in these lines of work, about \$3,400, of which \$2,000 is for salaries and \$1,400 for traveling and other miscellaneous expenses.

TRACY, W. W., Jr. Assistant botanist in charge of Plant Introduction Garden, Chico, Cal. This garden, which is 80 acres in extent, is maintained principally as a propagating and plant introduction station for the testing and distribution of new and valuable plants secured by agricultural explorers in various parts of the world (see Fairchild). The work is conducted in cooperation with the California experiment station. Forage crops, vegetables, fruits, and plants of all kinds except those adapted to tropical conditions or to latitudes of extreme cold are now under trial. Considerable work is being carried on by various offices of the Bureau at the Garden in the improvement

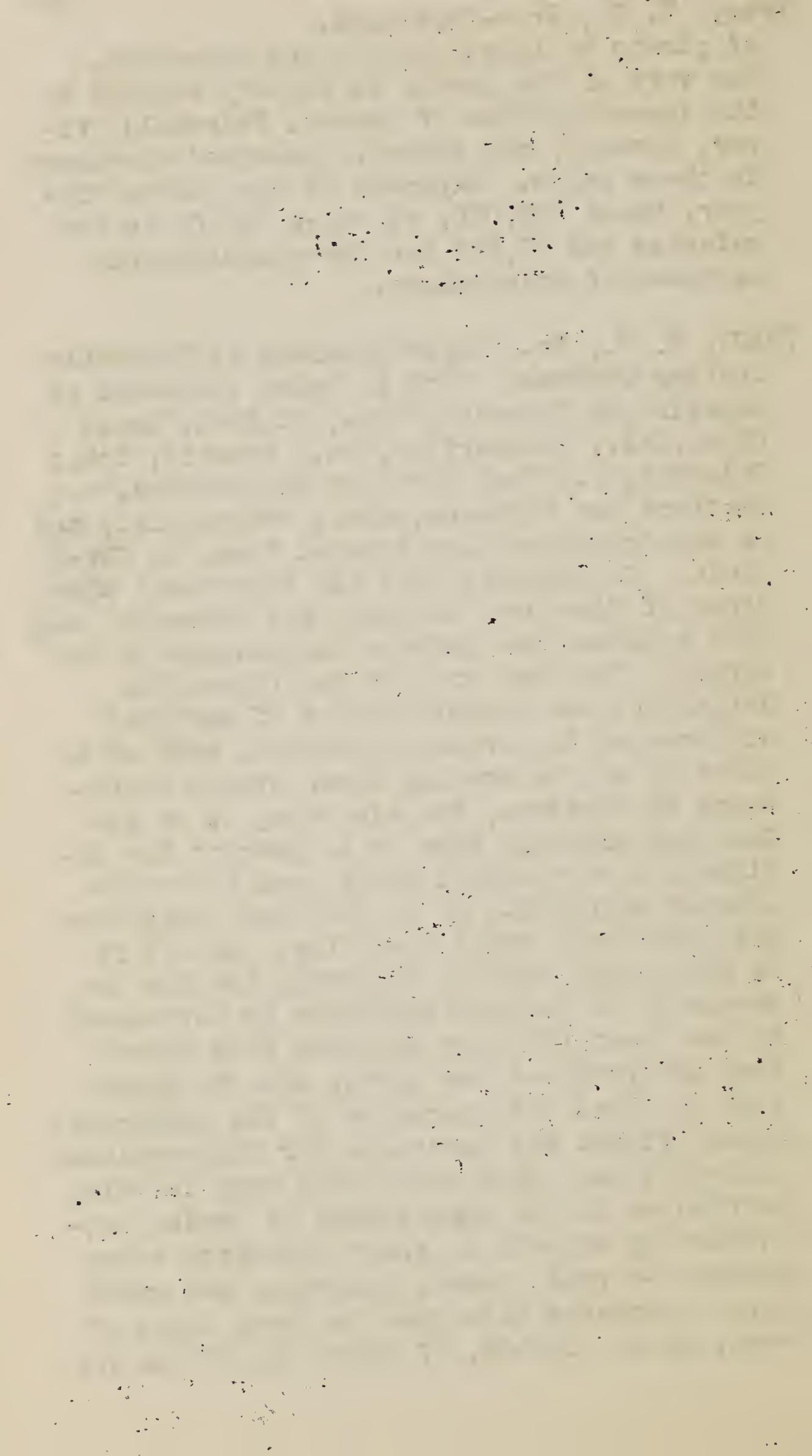


Tracy, W. W., Jr.--Continued.

of plants by hybridization and selection.

The work of the garden is closely related to the investigations of Messrs. Fairchild, Piper, Husmann, and others, described elsewhere in these pages. Expenses of the garden this year, about \$12,000, of which \$6,500 is for salaries and \$5,500 for the miscellaneous expenses of maintenance.

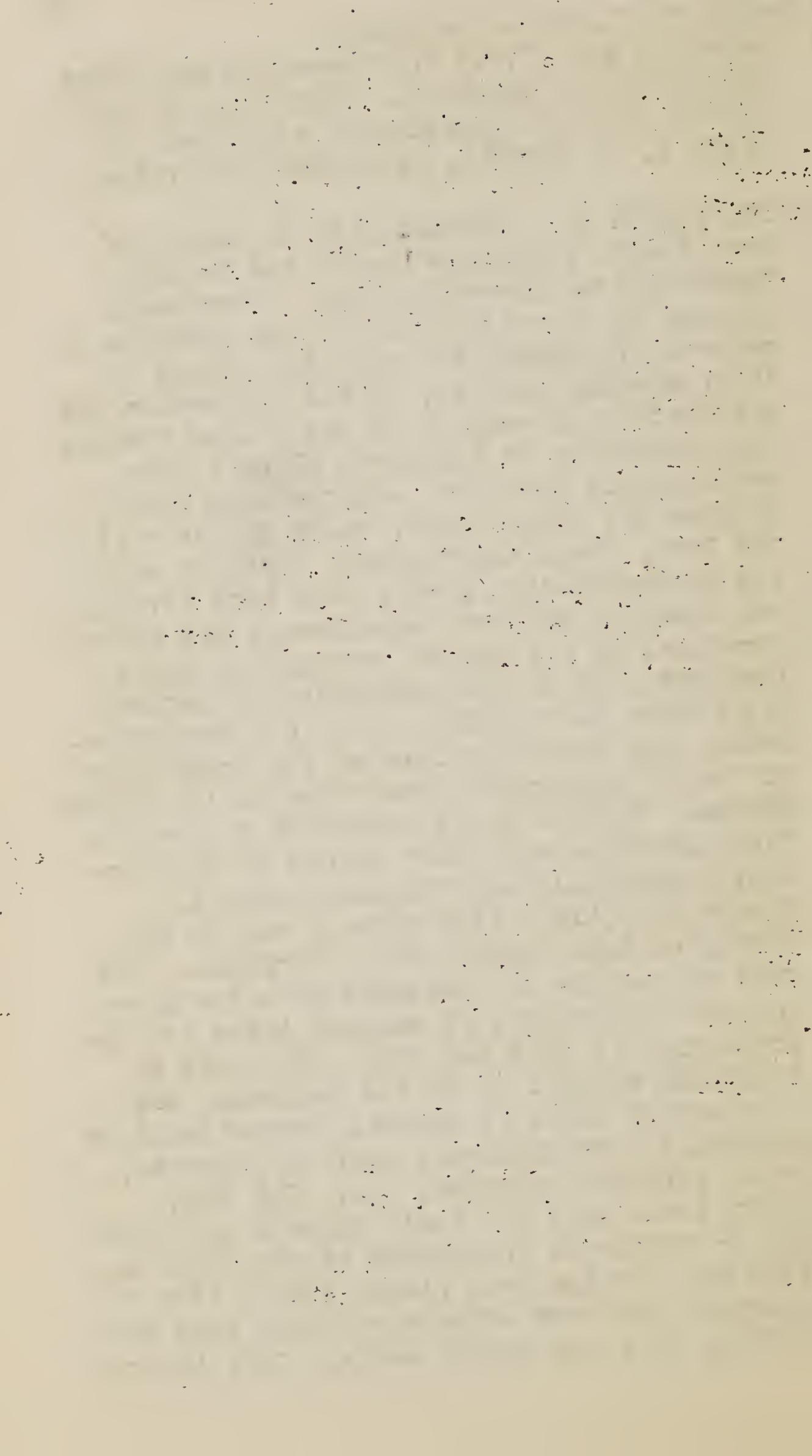
TRACY, W. W., Sr. Superintendent of Vegetable Testing Gardens. Work is being conducted at Lincoln and Waterloo, Nebr.; St. Paul, Minn.; Chico, Cal.; Brownsville, Tex.; Detroit, Mich.; Columbia, Mo.; West Hartford and Rutland, Vt.; Hartford and Hockanum, Conn.; Auburn, Ala.; and on the Arlington Experimental Farm, in Virginia. Cooperation with the experiment stations of Missouri, Alabama, and Nebraska, and with seedsmen and private individuals is in effect. The work has for its object the definition and classification of varietal differences in garden vegetables, both as to those in common use and newer stocks introduced by seedsmen, the aim being to so define and classify them as to prevent the duplication of varietal names, and to secure greater uniformity as to the exact variation any given name shall stand for. An effort is also being made to ascertain how far the character of garden vegetables is influenced by the location where the seed from which they are produced was grown; also to ascertain by trial the character of the commercial seeds offered and purchased for Congressional distribution. Some incidental work is being carried on in the improvement of garden vegetables by selection, chief attention being devoted to peas, beans, tomatoes, and sweet corn. Expenses this year in these lines of work, about \$12,000, of which \$11,000 is for



Tracy, W. W., Sr.--Continued.

salaries and \$1,000 for traveling and other miscellaneous expenses. This work is conducted in close association with that of Prof. L. C. Corbett, previously described.

TRUE, RODNEY H. Physiologist in charge of Drug Plant, Poisonous Plant, and General Physiological Investigations. Personally engaged in investigations of the relation of methods of growing and handling lemons to their keeping quality; of the production and utilization of camphor in the United States; the production of denatured alcohol from second-grade potatoes, unmarketable fruit, sorghum and other crops, waste products of the farm, etc.; experimental tests of various drug-producing plants from both foreign and domestic sources; experiments and demonstrations in red pepper growing for spice purposes, and in the production of perfumery plants and volatile oils on a commercial scale; and investigations of the production of tea in commercial quantities in the United States. Work is being conducted at Madison, Wis.; Riverside and other points in California; Summerville and Timmonsville, S. C.; Orange City, Fla.; Pierce, Tex.; and on the Arlington Experimental Farm, Virginia. The work on camphor is concerned with the growing and utilization of camphor trees for the production of gums and oils. The work on denatured alcohol is in its beginning and consists of tests of alcohol production from promising farm products, such as potatoes, sweet potatoes, cassava, etc. The drug plant tests have for their objects the testing in different localities of important native and foreign drug plants with a view to learning the best methods of their home production on a commercial scale. Much labora-



True, Rodney H.--Continued.

tory work is connected with these investigations. The work on tea has for its objects the ascertaining of the practicability of growing and manufacturing tea on a profitable commercial basis, and to work out the relation between quality and constituents, with a view to the improvement of processes and product. The work consists of both field and factory tests, as well as laboratory investigations. Expenses this year in these lines of work, about \$28,000, of which \$15,000 is for salaries and \$13,000 for traveling and other miscellaneous expenses. Dr. True is assisted by Messrs. S. C. Hood, Frank Rabak, G. F. Klugh, T. B. Young, G. F. Mitchell, and A. F. Sievers, and by Miss Alice Henkel. The investigations of Messrs. Alsb erg, Marsh, and Stockberger, described elsewhere in these pages, are directed by Dr. True.

TULL, JOHN H. Expert, Arlington Experimental Farm. See Corbett.

UMBERGER, H. J. C. Assistant agronomist, Grain Investigations. See Carleton.

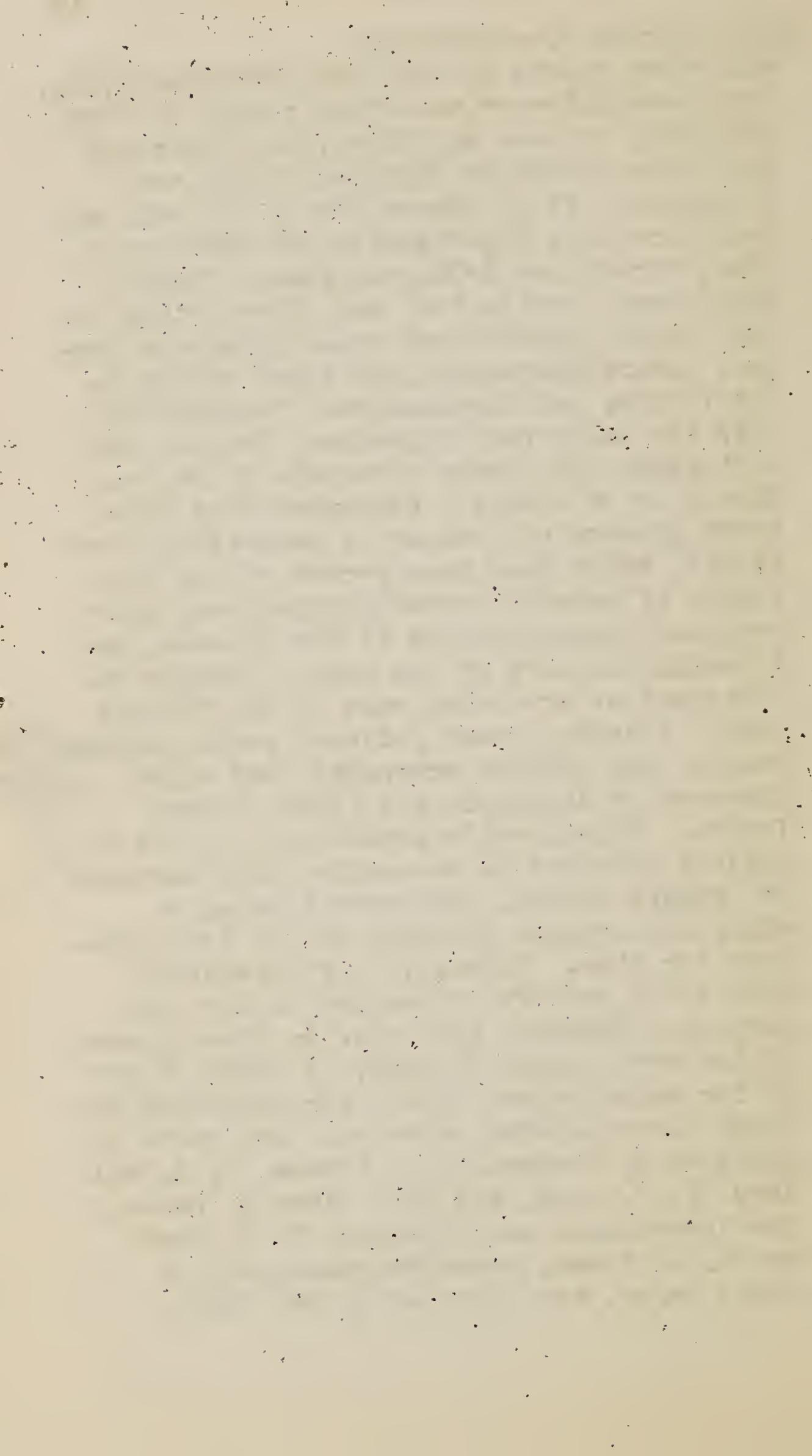
VINALL, H. N. Assistant in grass experiments, Forage Crop Investigations. See Cakley.

WAITE, MERTON B. Pathologist in charge of Investigations of Diseases of Fruits. Personally engaged in experiments and demonstrations in the eradication of pear blight, the "little peach" disease and peach yellows, various crown-gall diseases, etc. Work is being conducted at Seymour, Conn.; Youngstown



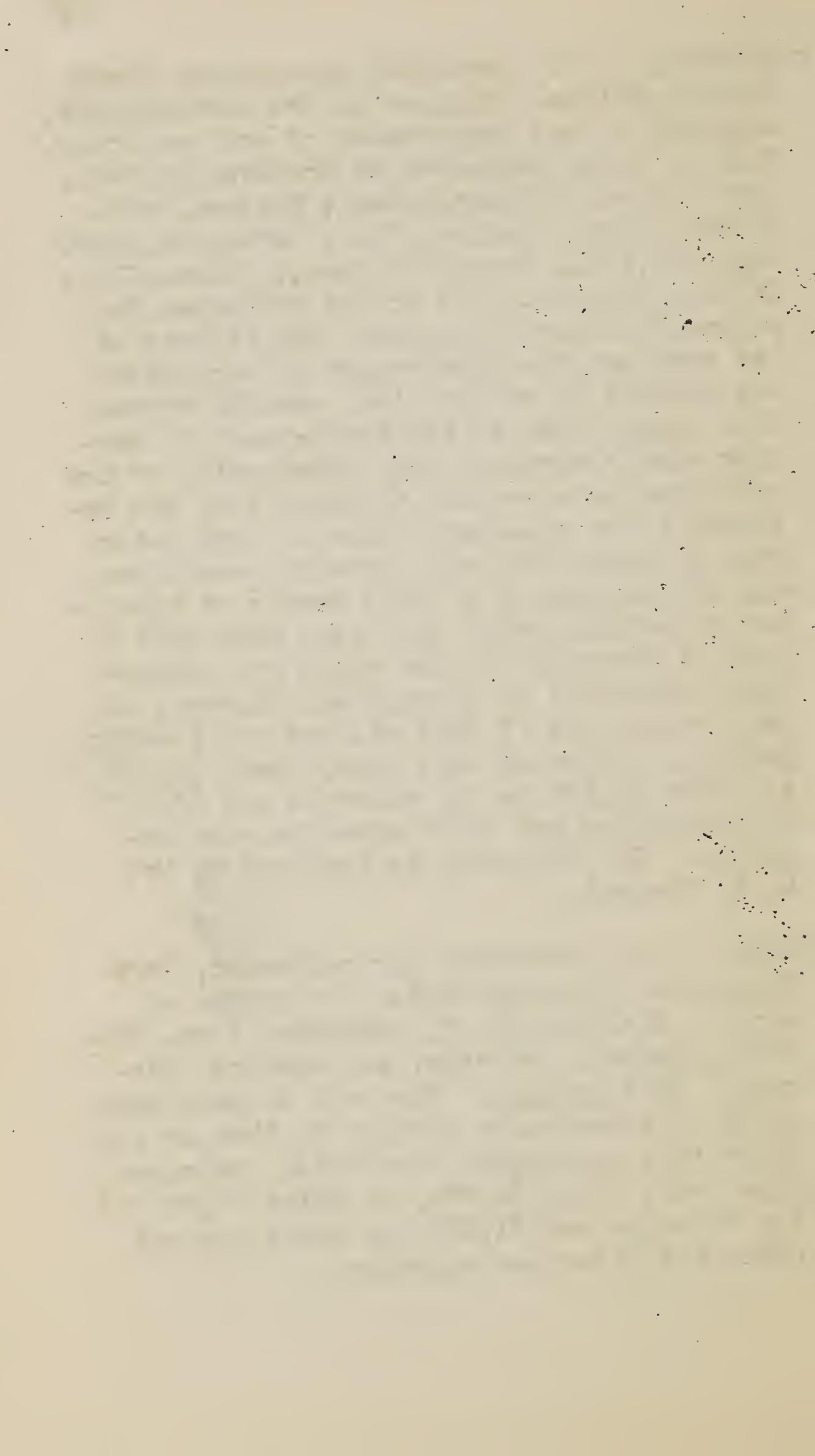
Waite, Merton B.—Continued.

and other points in New York; Waynesboro, Pa.; Martinsburg, Keyser, and other points in West Virginia; Thomson and Cairo, Ga.; Saugatuck and other points in Michigan; Olney and Bloomington, Ill.; Geneva, Nebr.; St. Louis and Louisiana, Mo.; Fayetteville and Farmington, Ark.; Topeka and Arlington, Kans.; Shenandoah, Iowa; Mesilla Park and other points in New Mexico; Medford and other points in Oregon; Auburn, Sacramento, and other points in California; and Richmond, Va. Cooperation with the California Experiment Station and with State and county officials in various States is in effect. Demonstrations among fruit growers of methods of controlling pear blight, which have been worked out as the result of careful bacteriological and microscopical investigations of the disease, are a leading feature of the work. Similar investigations are being made of the "little peach" disease, peach yellows, peach gumming fungus, and various crown-gall and other diseases of the apple and other orchard fruits. Considerable attention is given to various problems in connection with diseases of orchard fruits, the attempt being to study all orchard diseases and to find remedies for them. Extensive correspondence with fruit growers is carried on for this purpose. Expenses this year in these phases of the work, about \$12,000, of which \$7,000 is for salaries and \$5,000 for traveling and other miscellaneous expenses. Mr. Waite is assisted by Messrs. P. J. O'Gara, W. S. Ballard, F. V. Rand, and Miss Clara H. Hasse. The investigations of Messrs. W. M. Scott and C. D. Shear, described elsewhere in these pages, are directed by Mr. Waite.



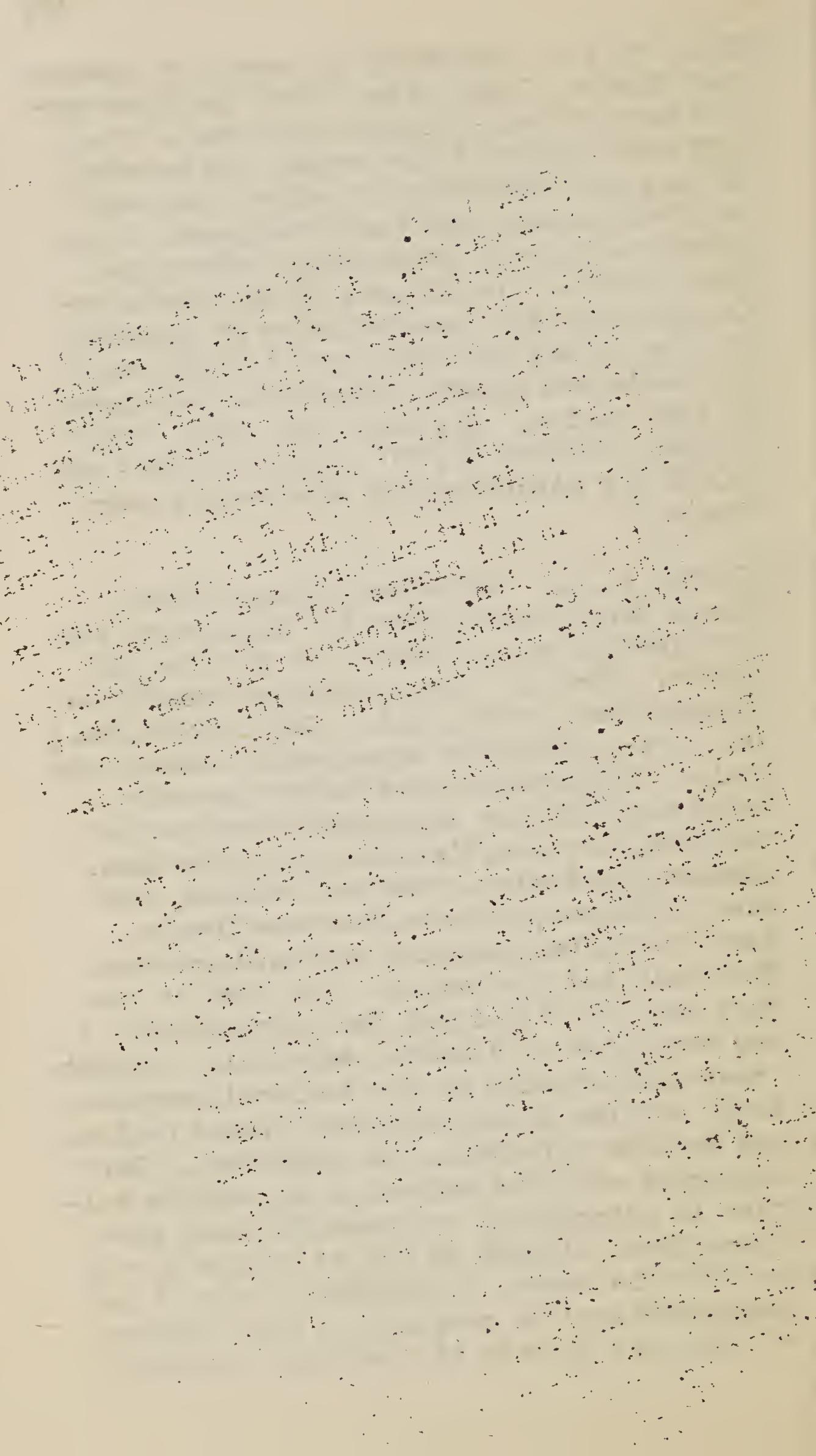
WARBURTON, C. W. Assistant agronomist, Grain Investigations. Engaged in the introduction, adaptation, and improvement of oat varieties. Work is being conducted at Brookings, S. Dak.; Agricultural College, N. Dak.; Bozeman, Mont.; St. Paul, Minn.; Madison, Wis.; McPherson, Kans.; Amarillo, Tex.; Knoxville, Tenn.; McLean, Ill.; College Park, Md.; and on the Arlington Experimental Farm, Virginia. The objects of the work are the improvement of varieties and methods of cultivation, special attention being given to the development of harder winter strains; the introduction of new varieties into regions to which they are believed to be especially adapted with reference to local soil and climatic conditions; and the testing of a large number of hybrids and selections which have been made with a view to securing strains which are productive, resistant to lodging and disease, of good color, and of high milling and feeding quality. Expenses this year, about \$4,000, of which \$3,000 is for salaries and \$1,000 for traveling and other miscellaneous expenses. Mr. Warburton is assisted by Mr. L. C. Burnett.

WARREN, J. A. Assistant agriculturist, Farm Management Investigations. In charge of work in District No. 7, embracing Iowa, Missouri, Kansas, Nebraska, and eastern Colorado. (See Brodie.) The work in this district is essentially similar to that in the other farm management districts. Expenses this year, about \$2,800, of which \$1,600 is for salaries and \$1,200 for traveling and other miscellaneous expenses.



WESTER, P. J. Assistant in charge of Subtropical Garden, Miami, Fla. Work includes the acclimatization of plants introduced from different parts of the world; the breeding of improved varieties of subtropical and tropical plants; and the development of improved methods of propagating subtropical fruit trees. The objects of the garden are to determine the possibilities of southern Florida in horticulture, and to test various seeds and plants believed to be adapted to that region. Expenses this year, about \$8,000, of which \$5,000 is for salaries and \$3,000 for miscellaneous expenses of maintenance.

WESTGATE, J. M. Assistant agrostologist, Forage Crop Investigations. Engaged in the introduction and extension of alfalfa and clover. Work is being conducted chiefly at Pullman, Wash.; Chico, Cal.; Chillicothe, Tex.; and on the Arlington Experimental Farm, Virginia. Cooperative experiments are also under way with the experiment stations of New York, Maryland, Virginia, North Carolina, Alabama, Mississippi, Ohio, and Indiana, and also in Kansas, Colorado, Nebraska, Oregon, Idaho, North Dakota, South Dakota, Minnesota, Wisconsin, and New Mexico. The work in the West has for its object the introduction of new varieties of alfalfa, especially drought-resistant strains in the semiarid sections, hardy strains in the northern plains region, and Arabian alfalfa in the Southwest. Work concerned with the extension of alfalfa culture is principally confined to those sections where alfalfa is not as staple a crop as there is reason to believe it should be. Demonstrations in cooperation with farmers of the best methods of securing and main-



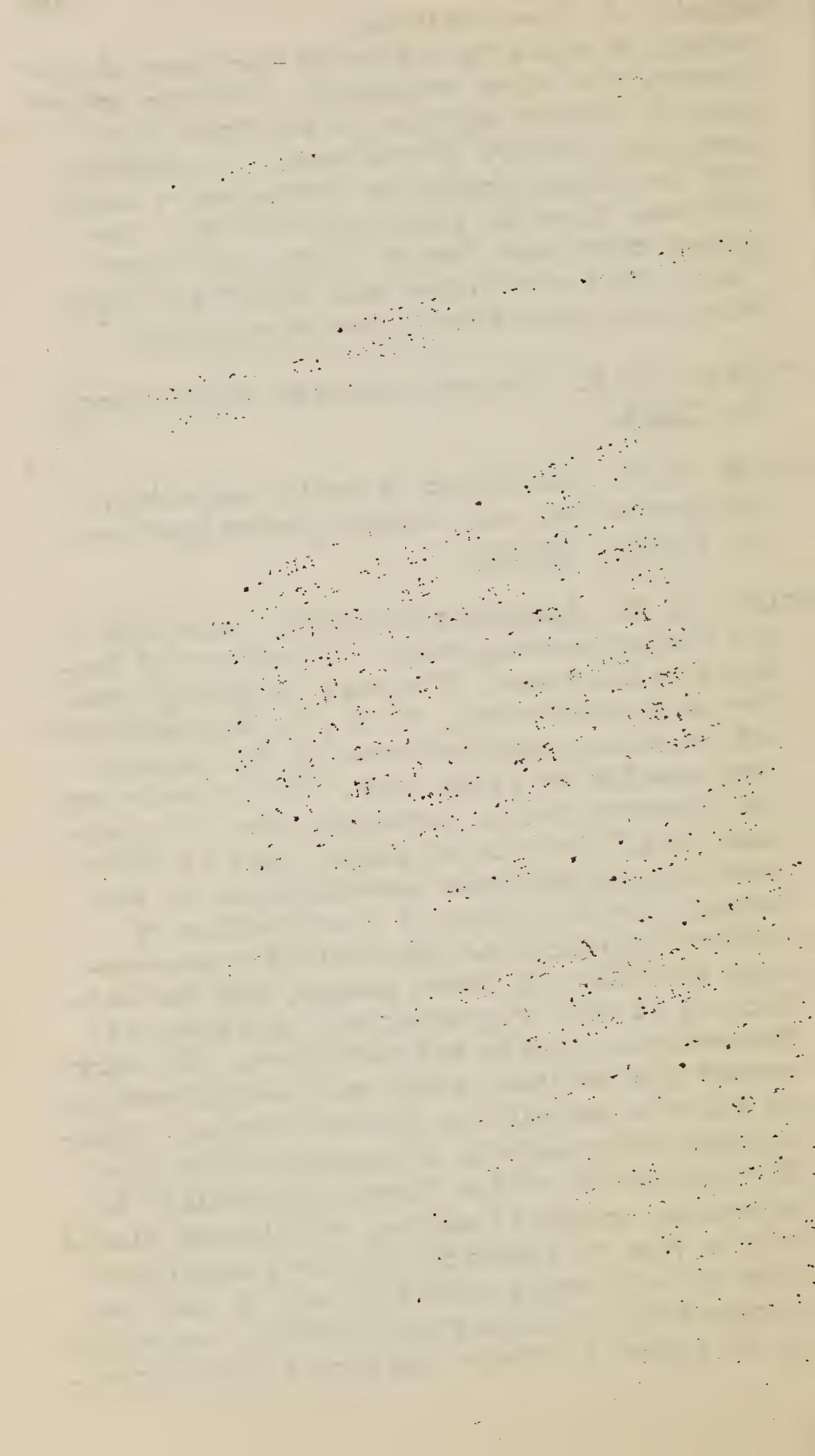
Westgate, J. M.--Continued.

taining a stand in different sections of the country are being conducted. The encouragement of alfalfa culture in the East is a prominent feature of the work. Incidental work is being carried on with clovers along the same lines as that with alfalfa. Expenses this year, about \$7,000, of which \$4,500 is for salaries and \$2,500 for traveling and other miscellaneous expenses.

WHEELER, C. F. Expert, Economic Collections.  
See Wight.

WHITE, H. M. Assistant in fruit marketing, transportation, and storage investigations.  
See Powell; Taylor.

WIGHT, W. F. Assistant botanist, Taxonomic and Range Investigations. In charge of Economic Collections. The work is mainly performed at Washington, D. C., in cooperation with various other branches of the Bureau, supplemented by field work. The objects are the preservation in permanent form of specimens of all introduced plants, and of other economic plants under investigation by the Bureau; the formation of a collection of cultivated plants as the basis for an accurate knowledge of these plants; and the collection of data regarding the hardiness of the various species and varieties. The work covers the critical study and identification of all the material in the collection. Studies are being made in cooperation with the Horticulturist of the Bureau concerning the botanical origin of various cultivated plants with a view to assisting in the classification of cultivated varieties and in the determination of their relationships, especially in regard to their bearing on plant breed-



Wight, W. F.--Continued.

ing. In cooperation with the office of Foreign Plant Introduction, an index of economic plants desirable for introduction into the United States is in preparation. The object of this index is to provide means of making a more thorough exploration of the plant resources of various countries, by furnishing in advance information and descriptions of the economic plants, and a detailed statement of their geographic distribution. Expenses this year, about \$12,000, of which \$10,000 is for salaries and \$2,000 for traveling and other miscellaneous expenses. Mr. Wight is assisted by Messrs. C. F. Wheeler, P. L. Ricker, and H. C. Skeels.

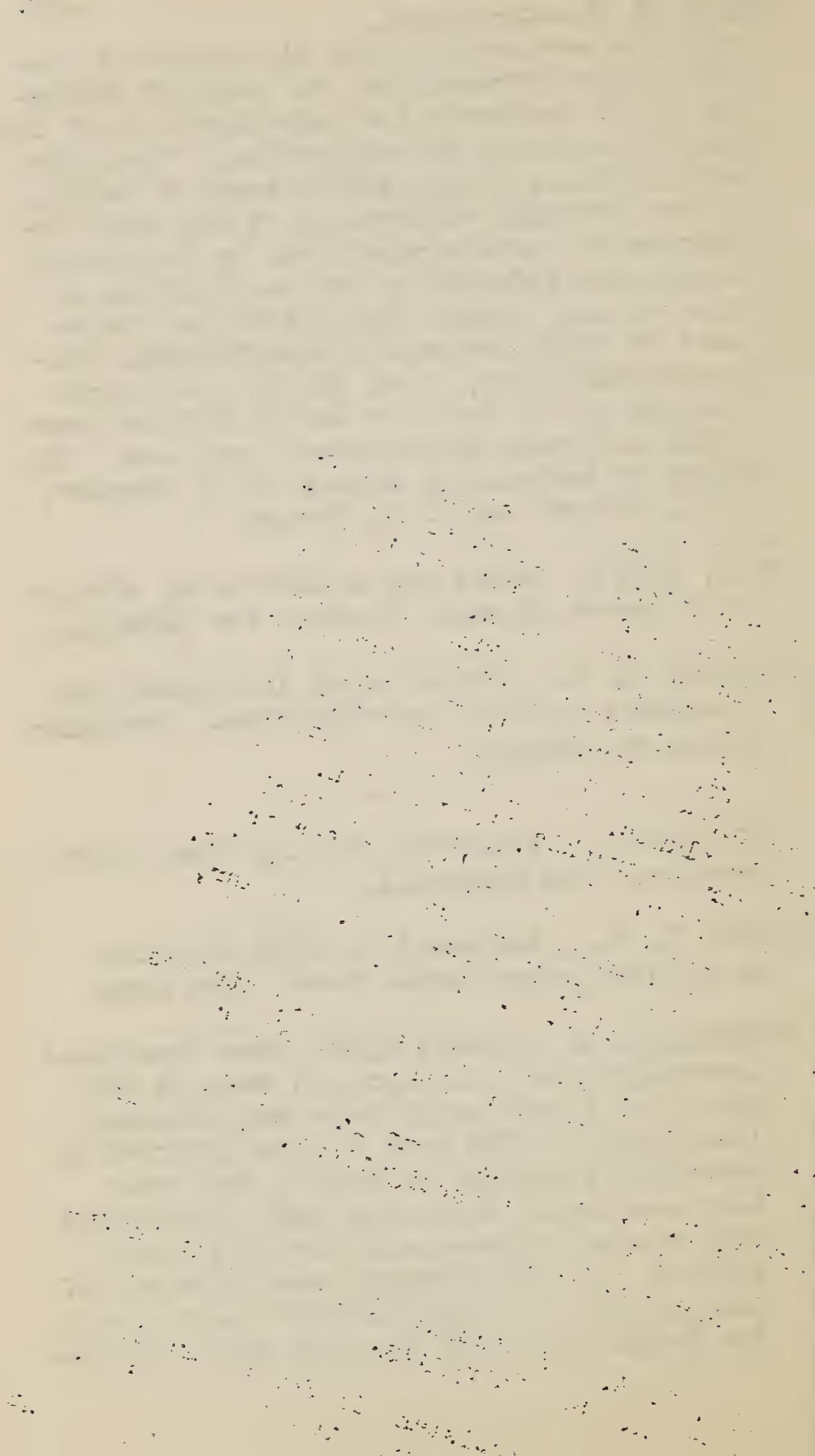
WOOD, ANNA K. Assistant in laboratory studies of diseases of small fruits. See Shear, C. L.

WOOSLEY, H. C. Special agent in Kentucky and Tennessee tobacco investigations. See Mathewson and Shanel.

YOUNG, R. A. Assistant, Foreign Plant Introduction. See Fairchild.

YOUNG, T. B. Assistant in South Carolina drug plant experimental tests. See True.

YOUNGBLOOD, B. Special agent, Farm Management Investigations. In charge of work in District No. 4, embracing Texas and Oklahoma. (See Brodie.) The work in this district is essentially similar to that in the other farm management districts, and is conducted with special reference to the boll weevil problem. An agricultural reconnaissance of that portion of Oklahoma which was formerly the Indian Territory is being made, in order



Youngblood, E.--Continued.

to obtain information that will aid in the work and also in answering the numerous inquiries received. Expenses this year in this district, about \$4,500, of which \$2,300 is for salaries and \$2,200 for traveling and other miscellaneous expenses.

ZOCK, L. L. Assistant, Corn Investigations.

See Hartley.



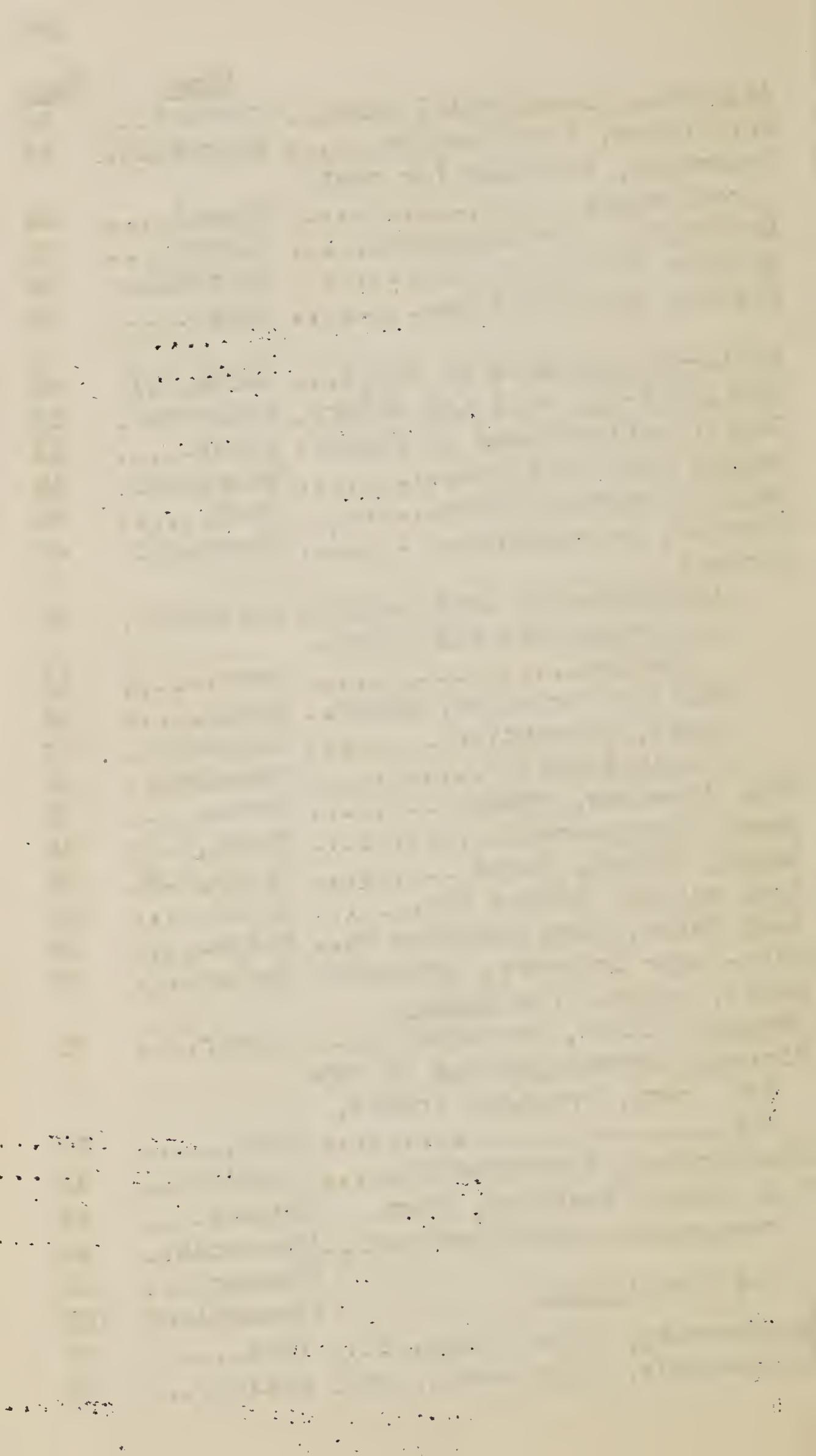
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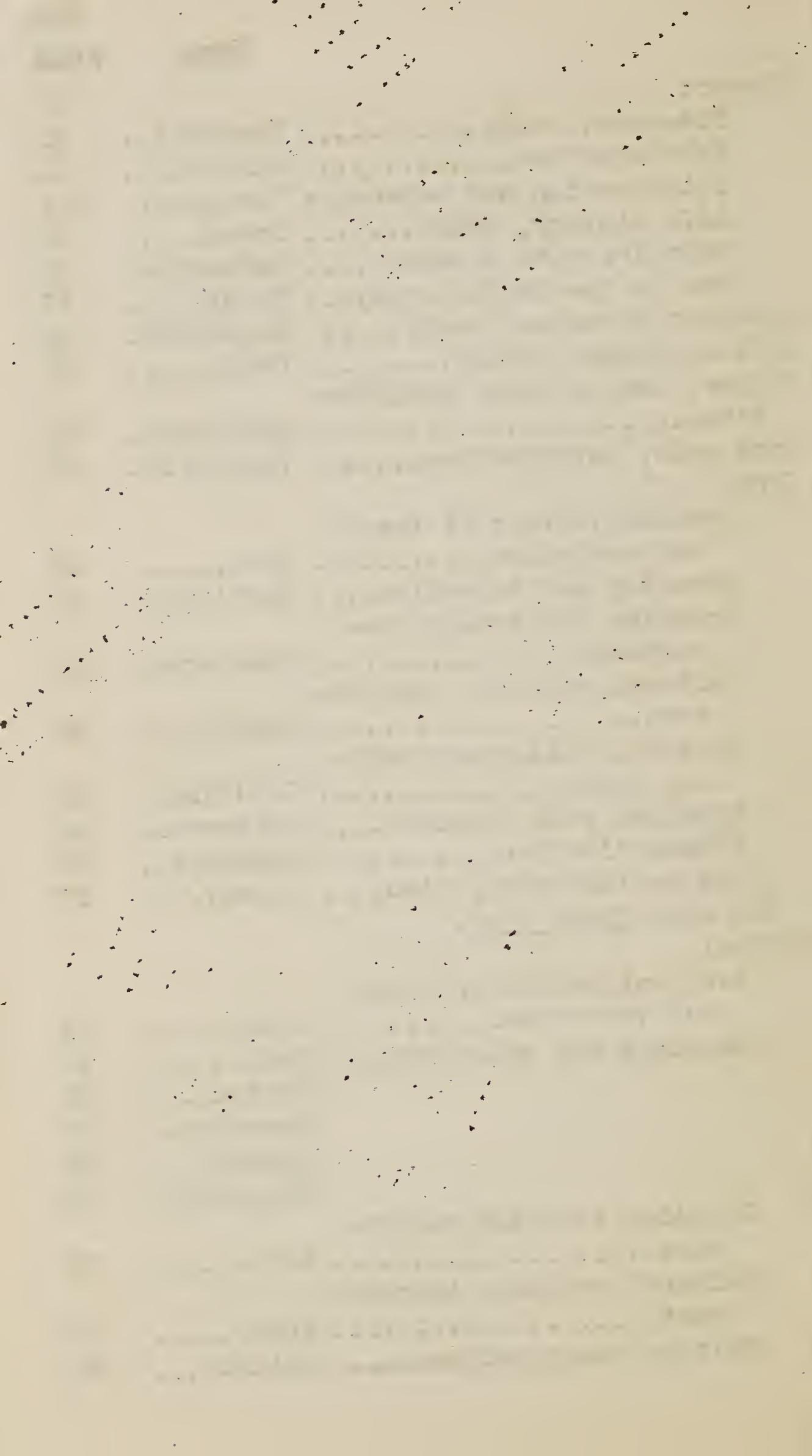
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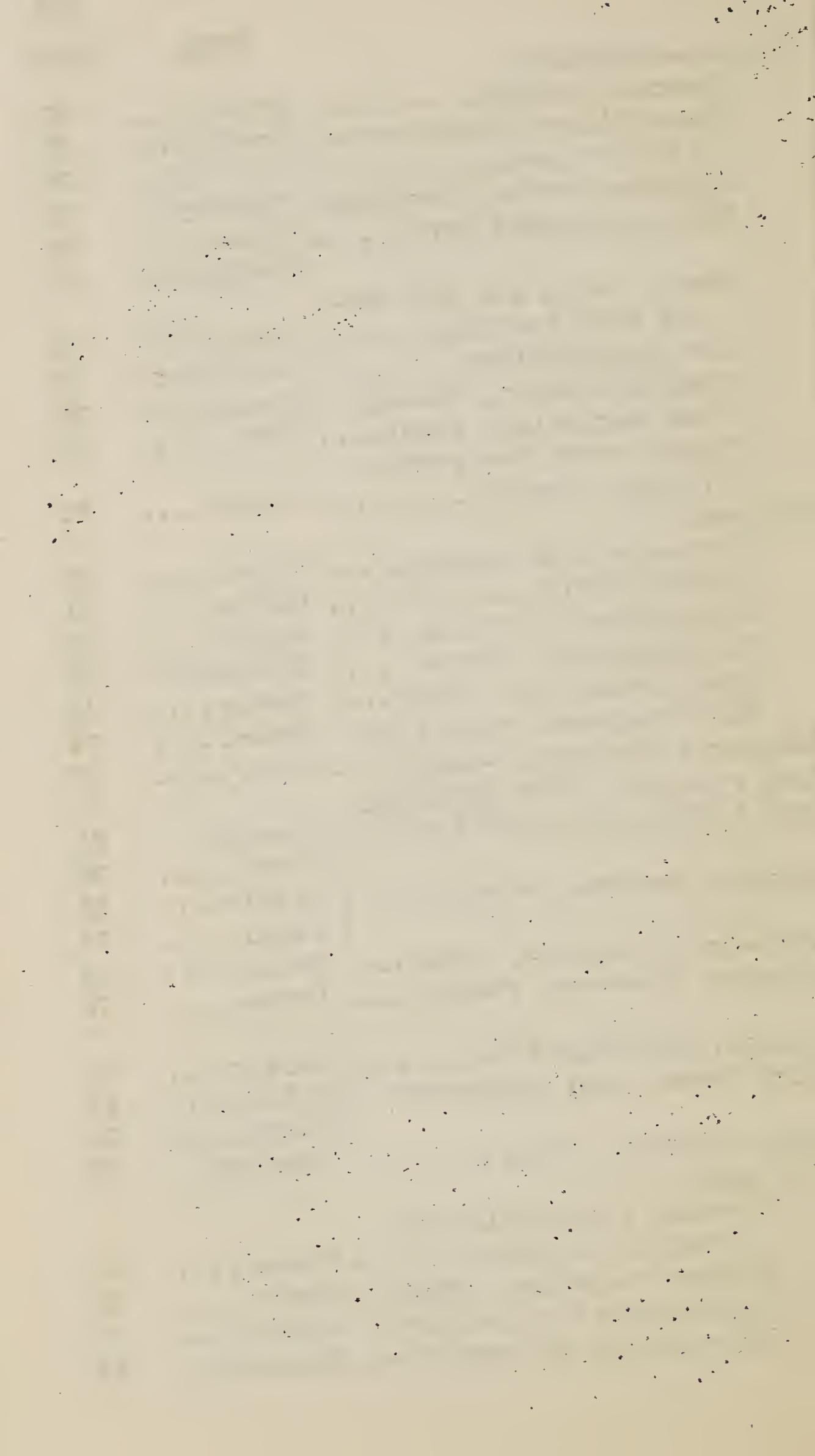
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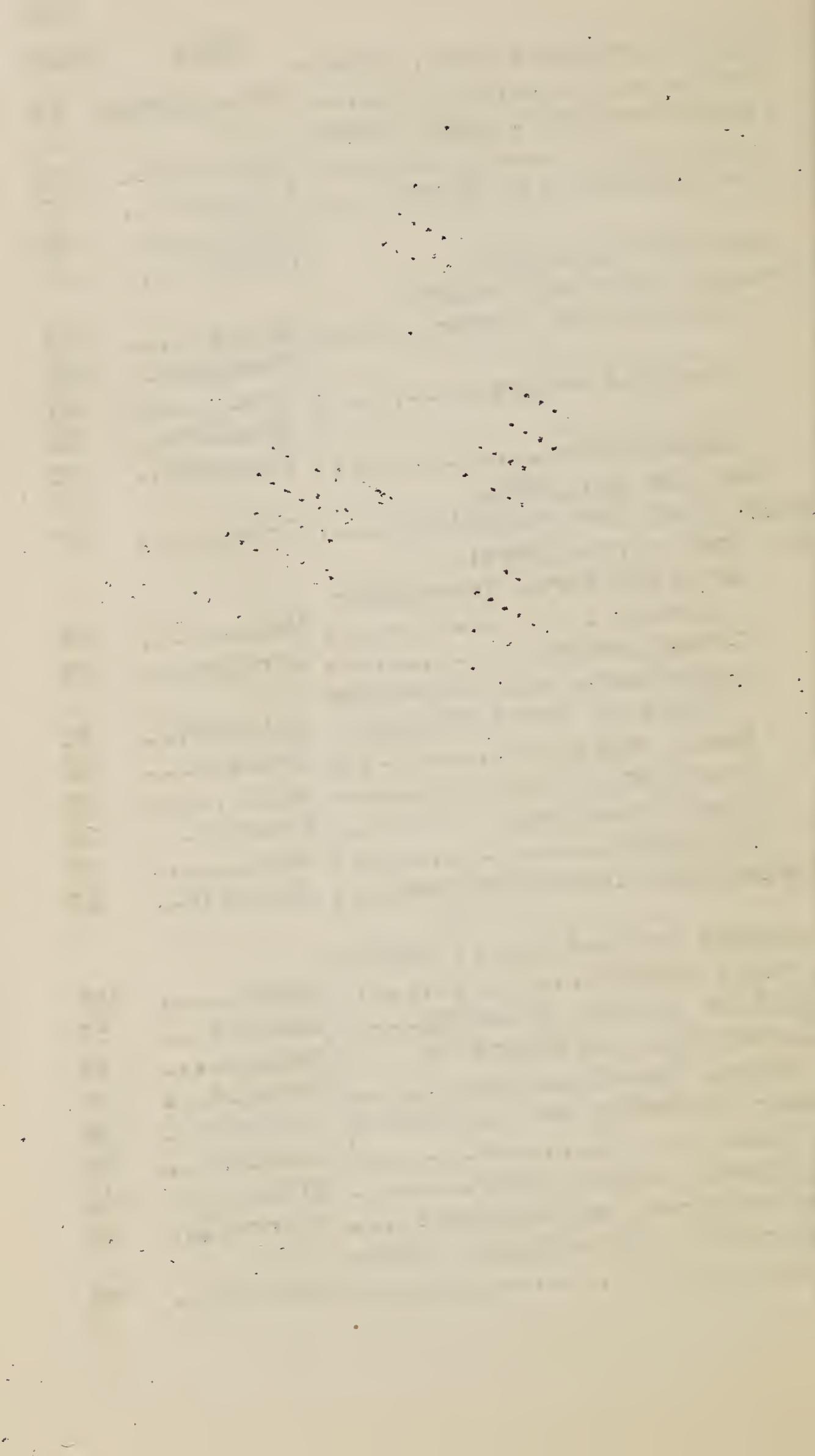


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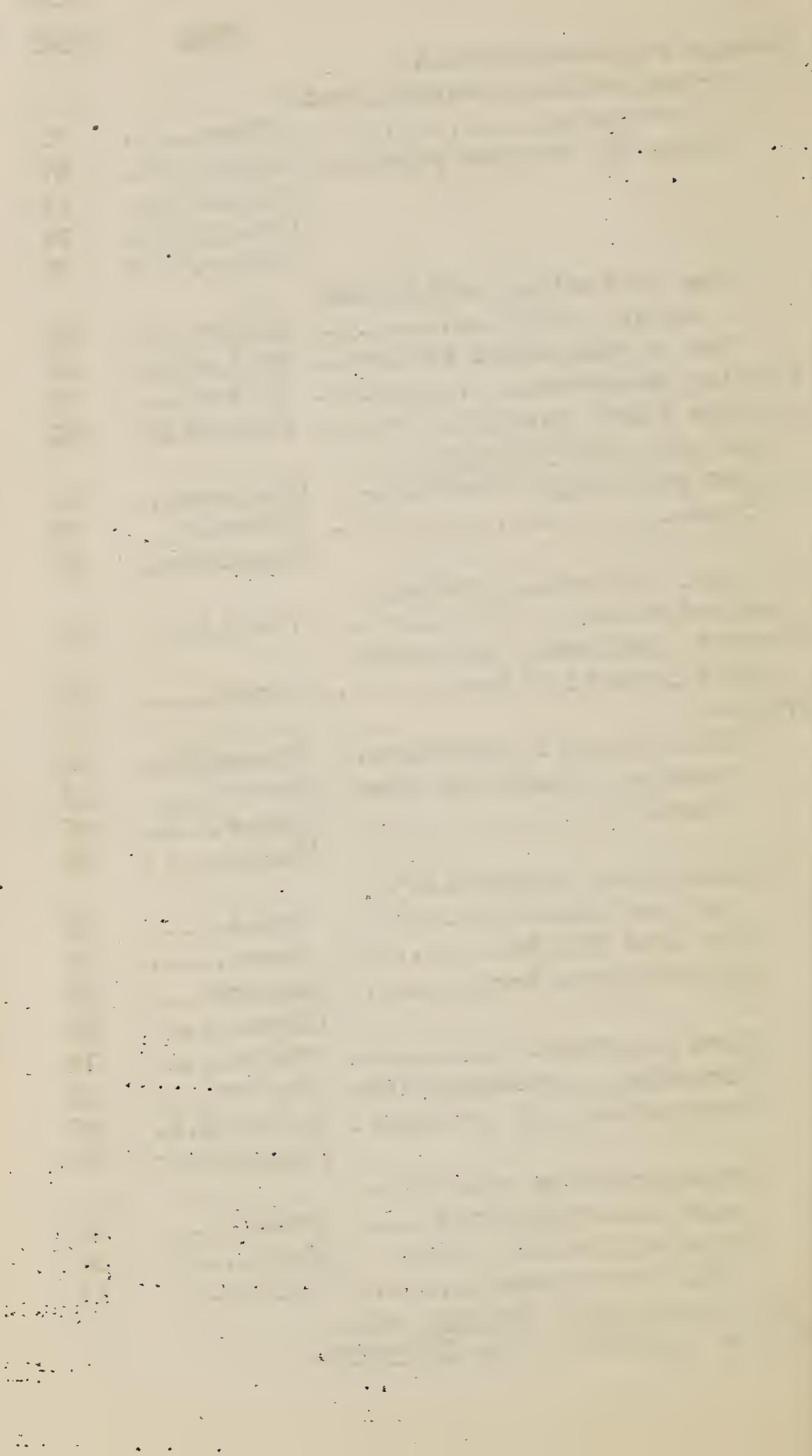


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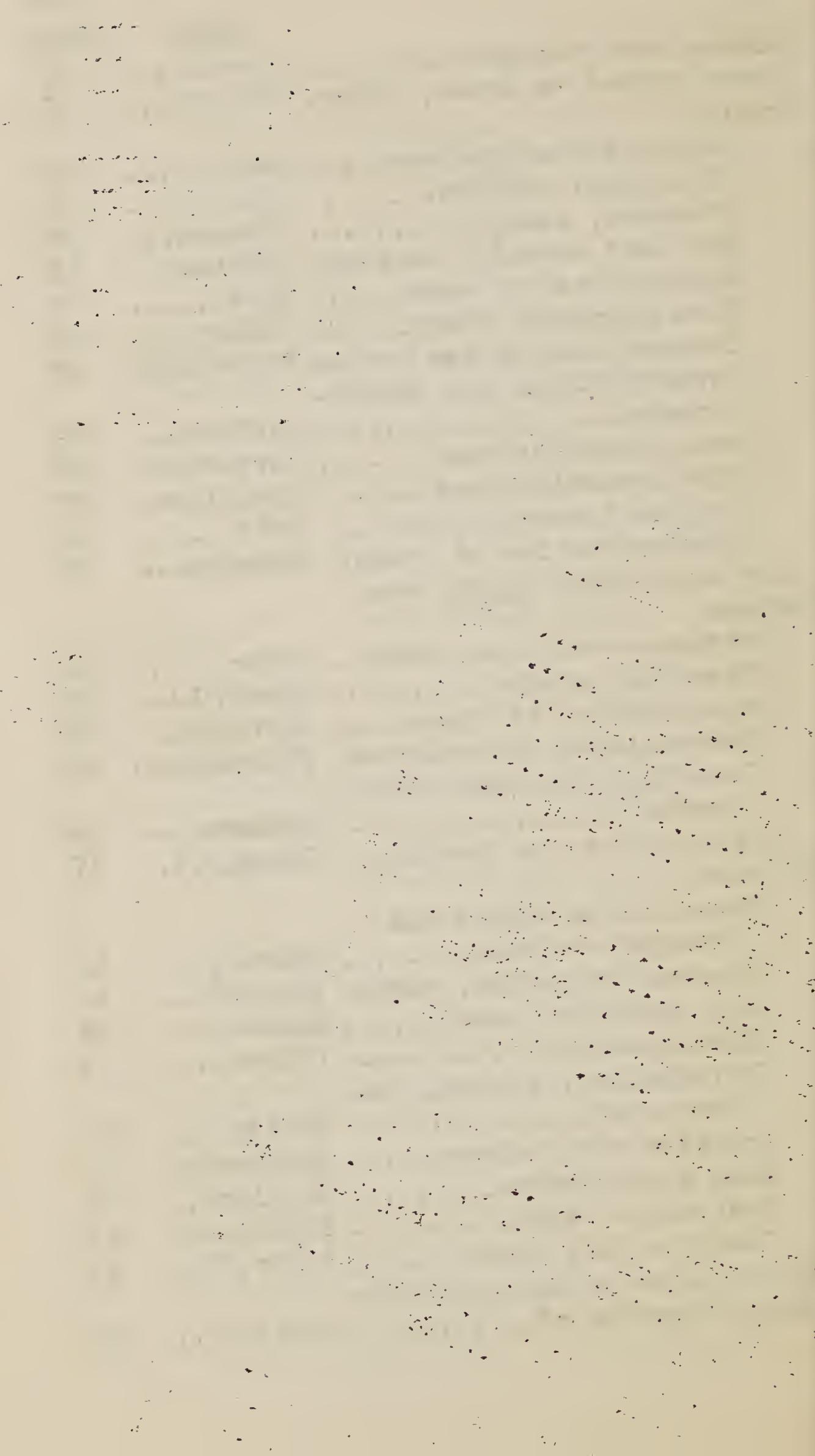


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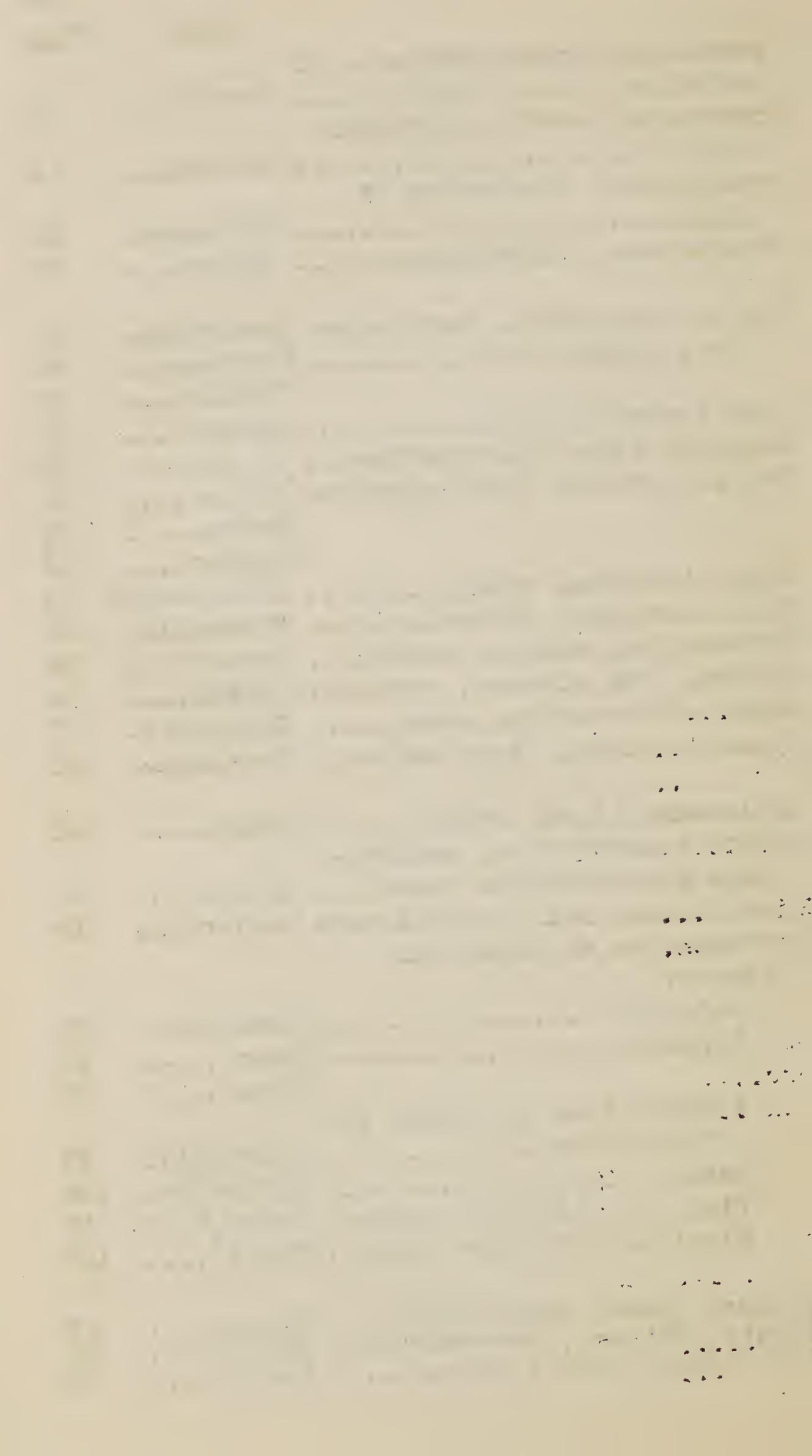
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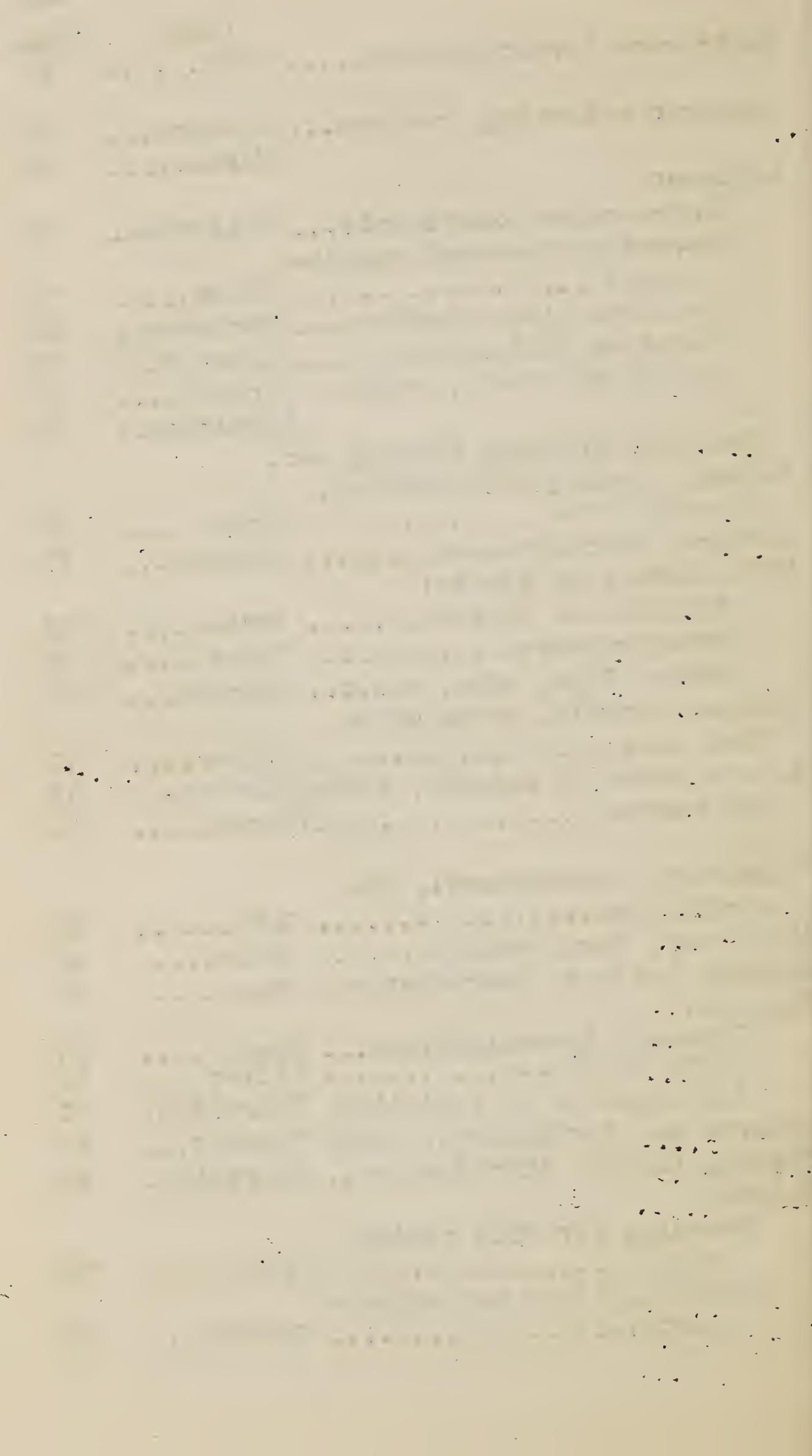
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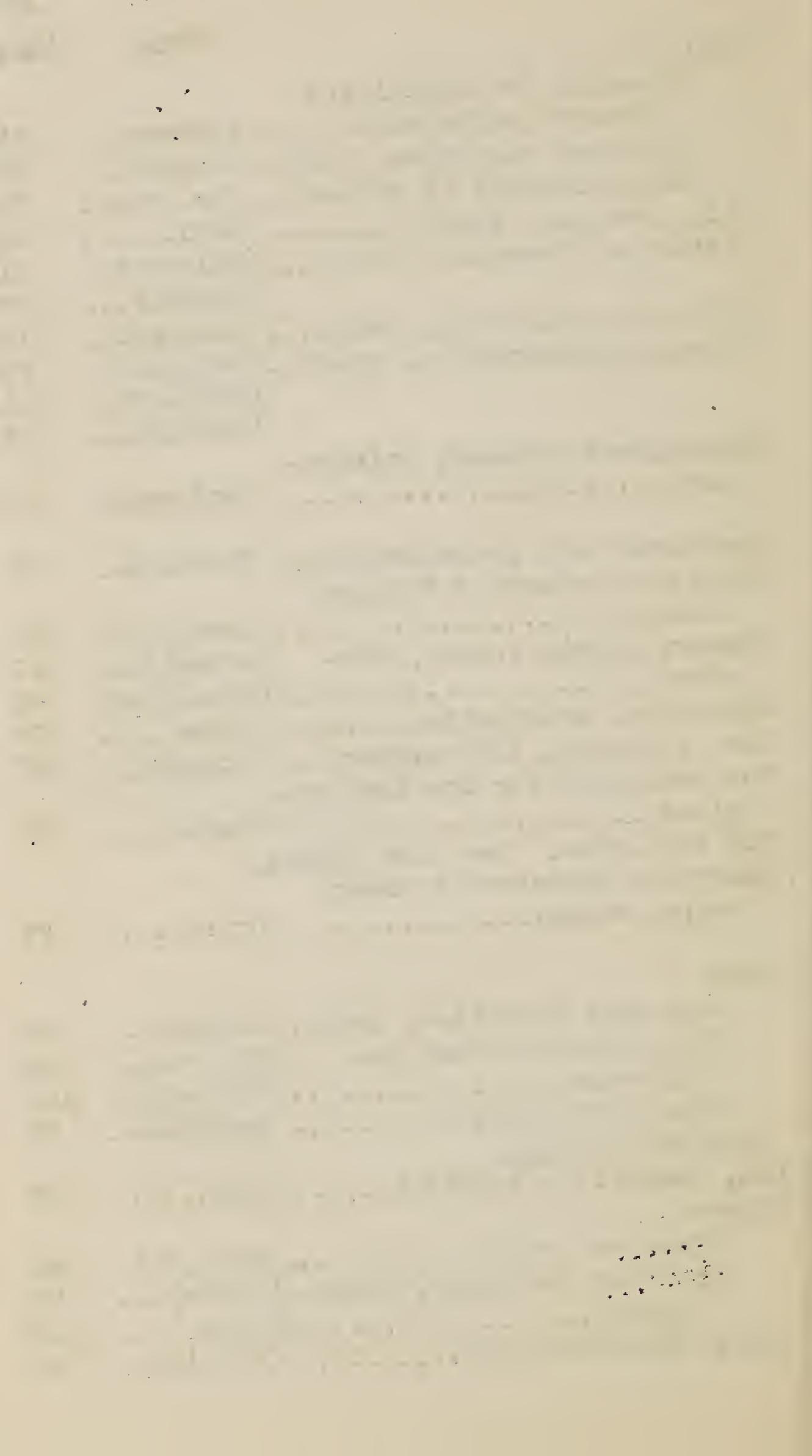
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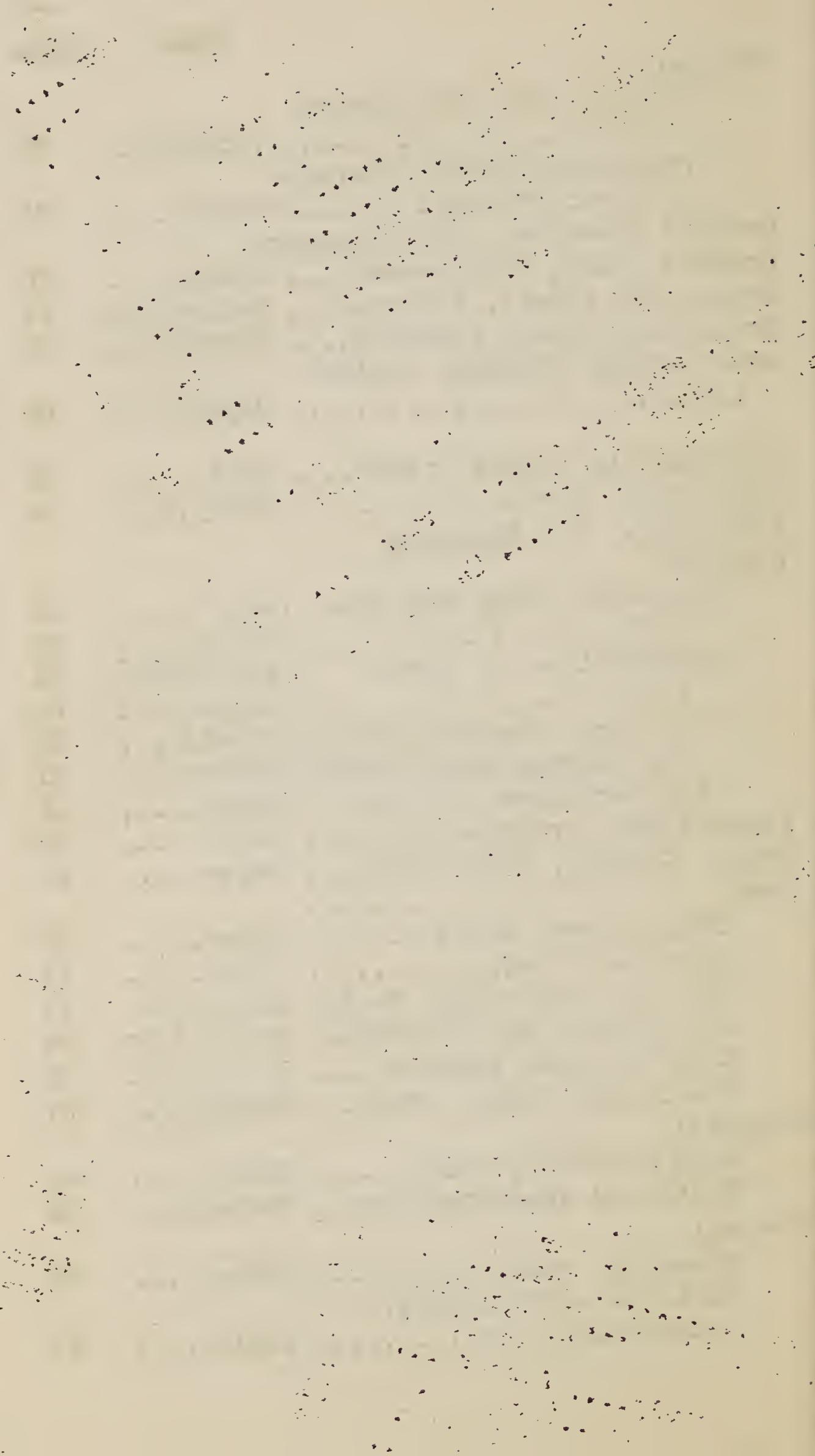
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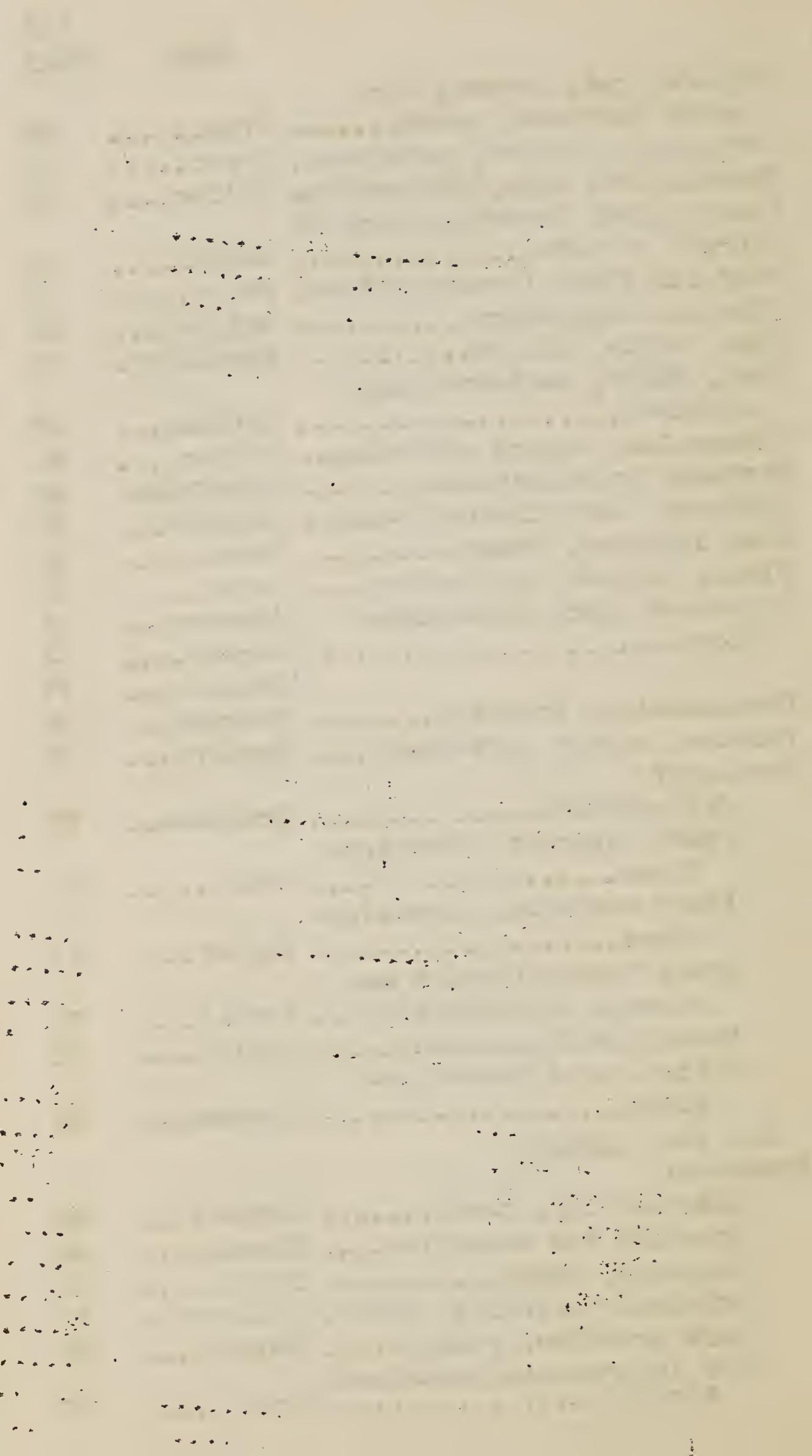
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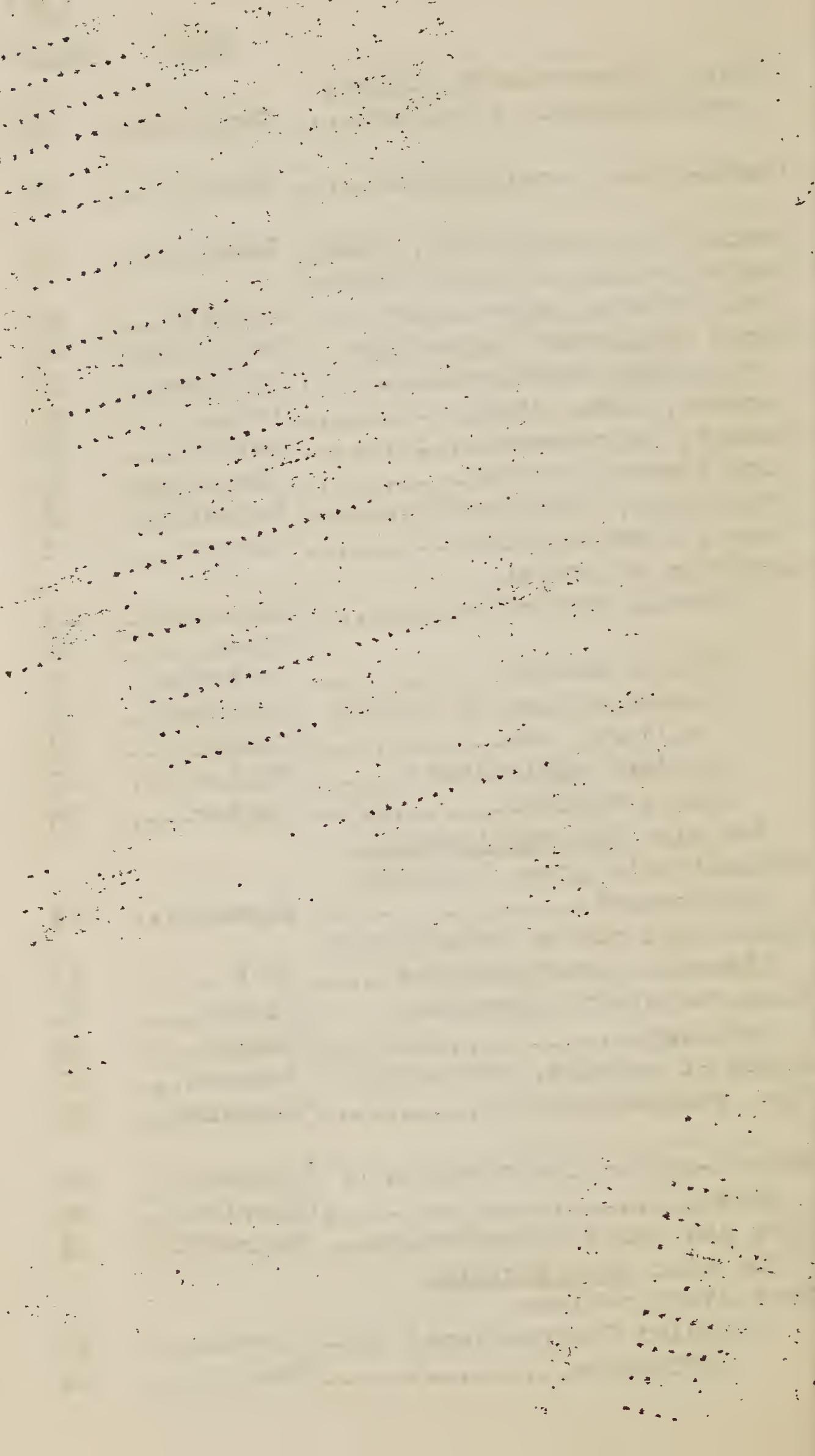
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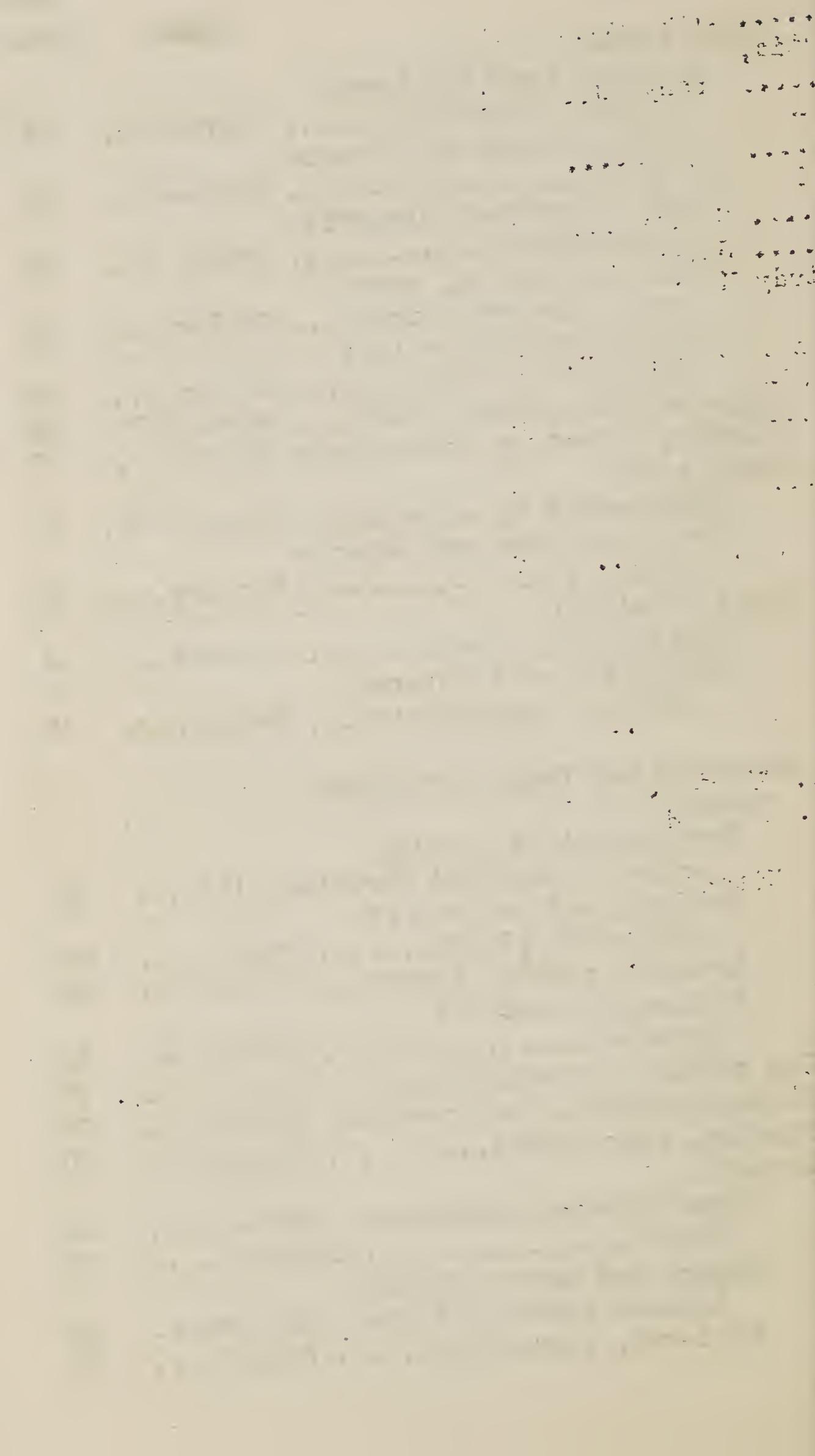
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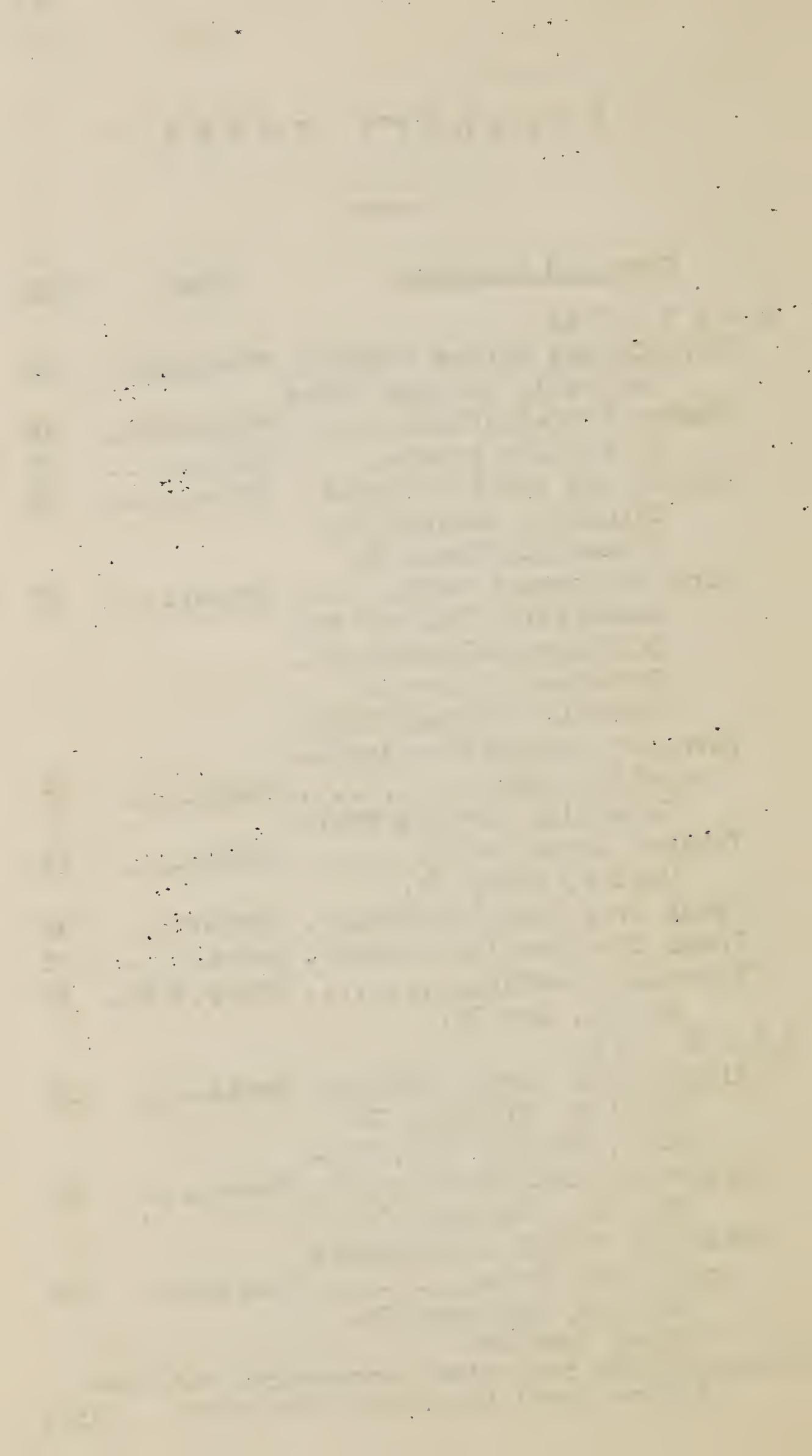
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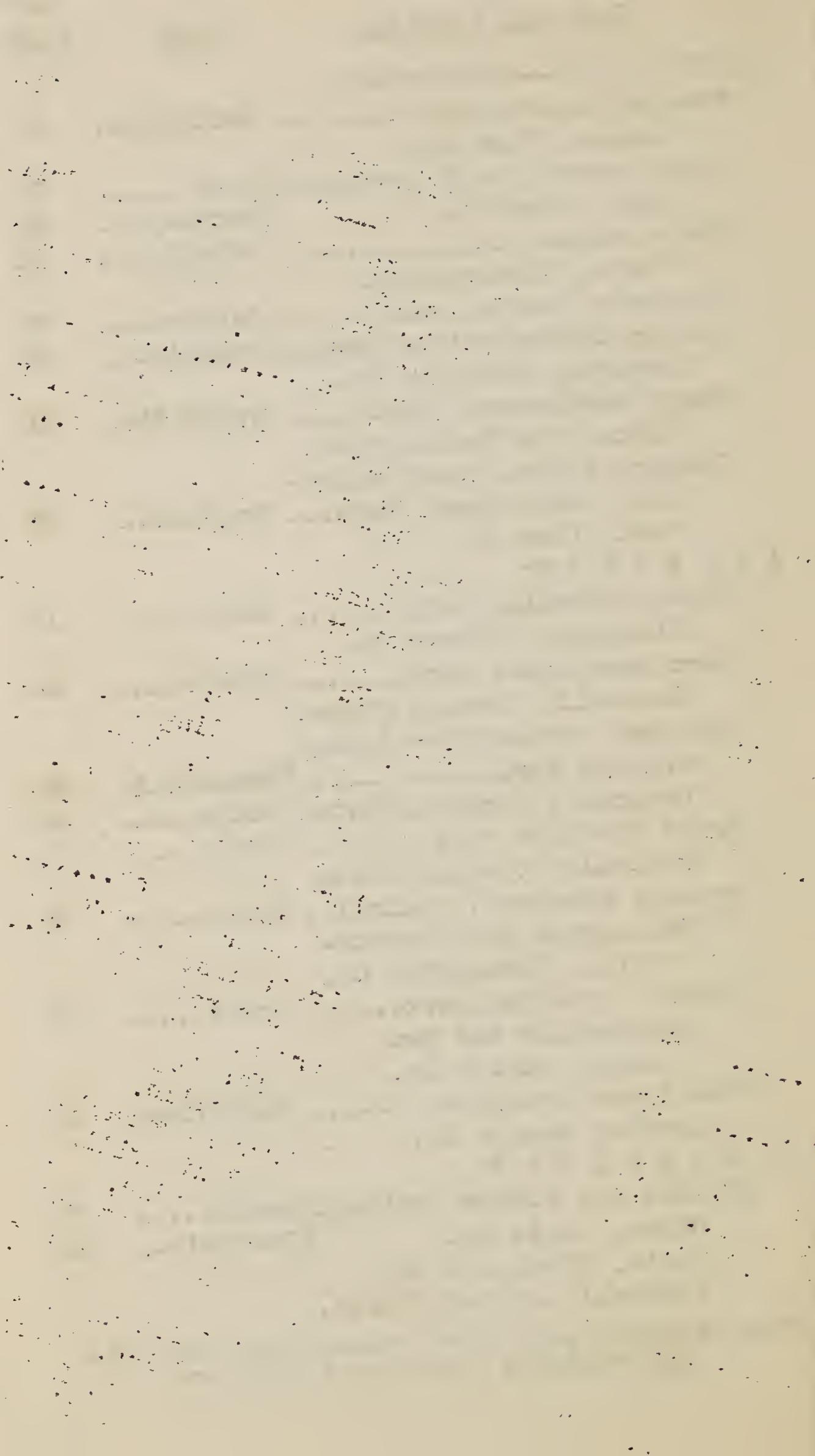
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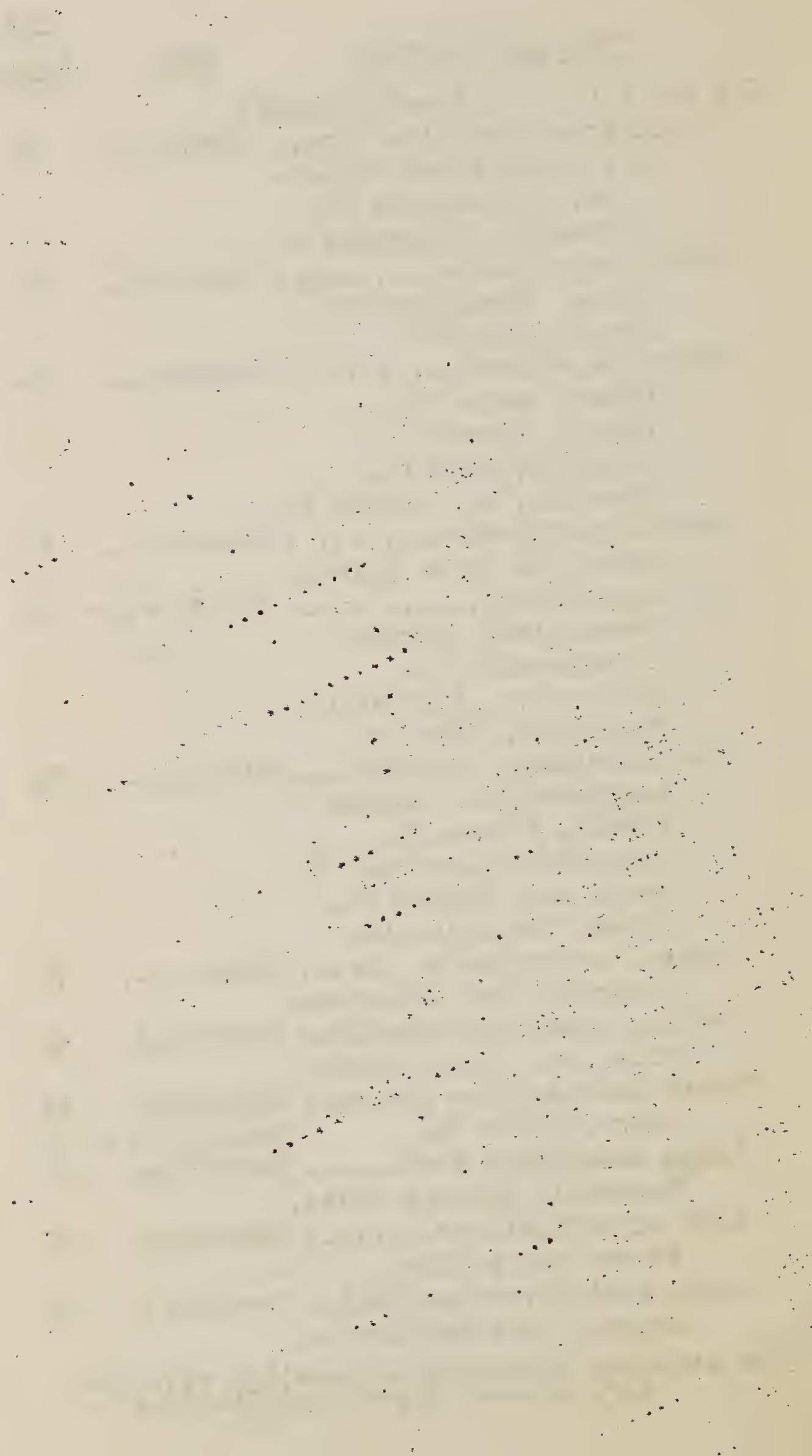


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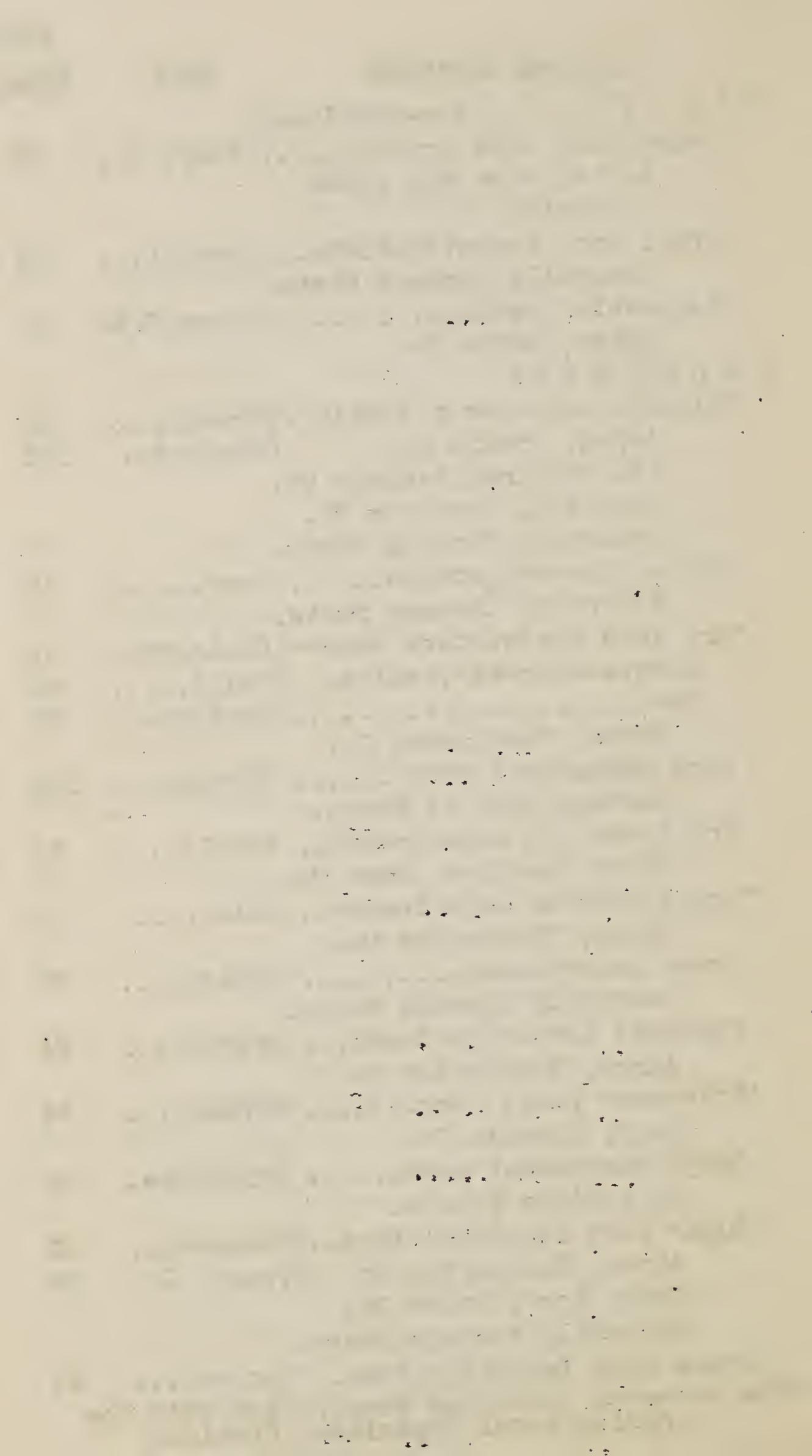


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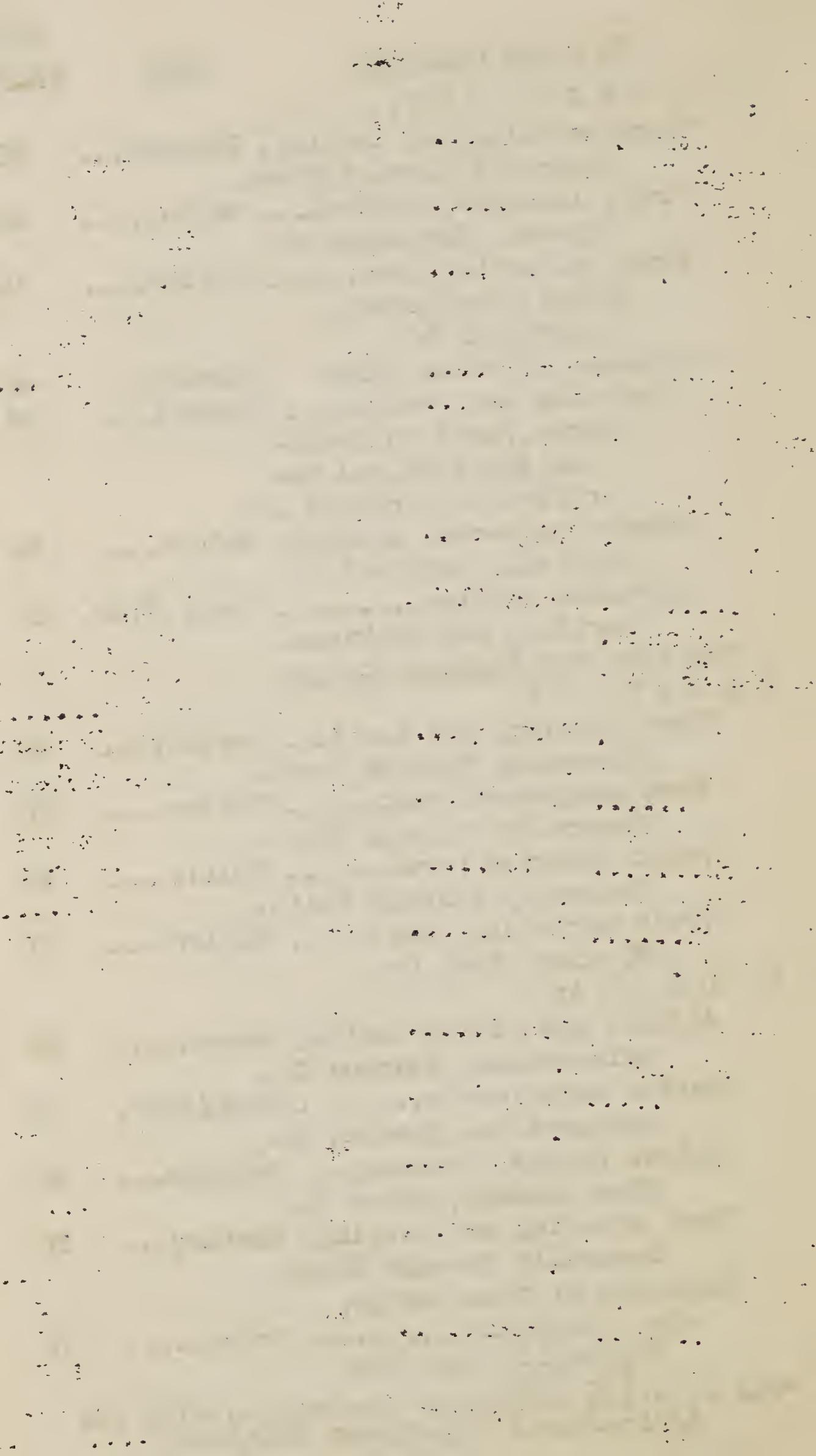
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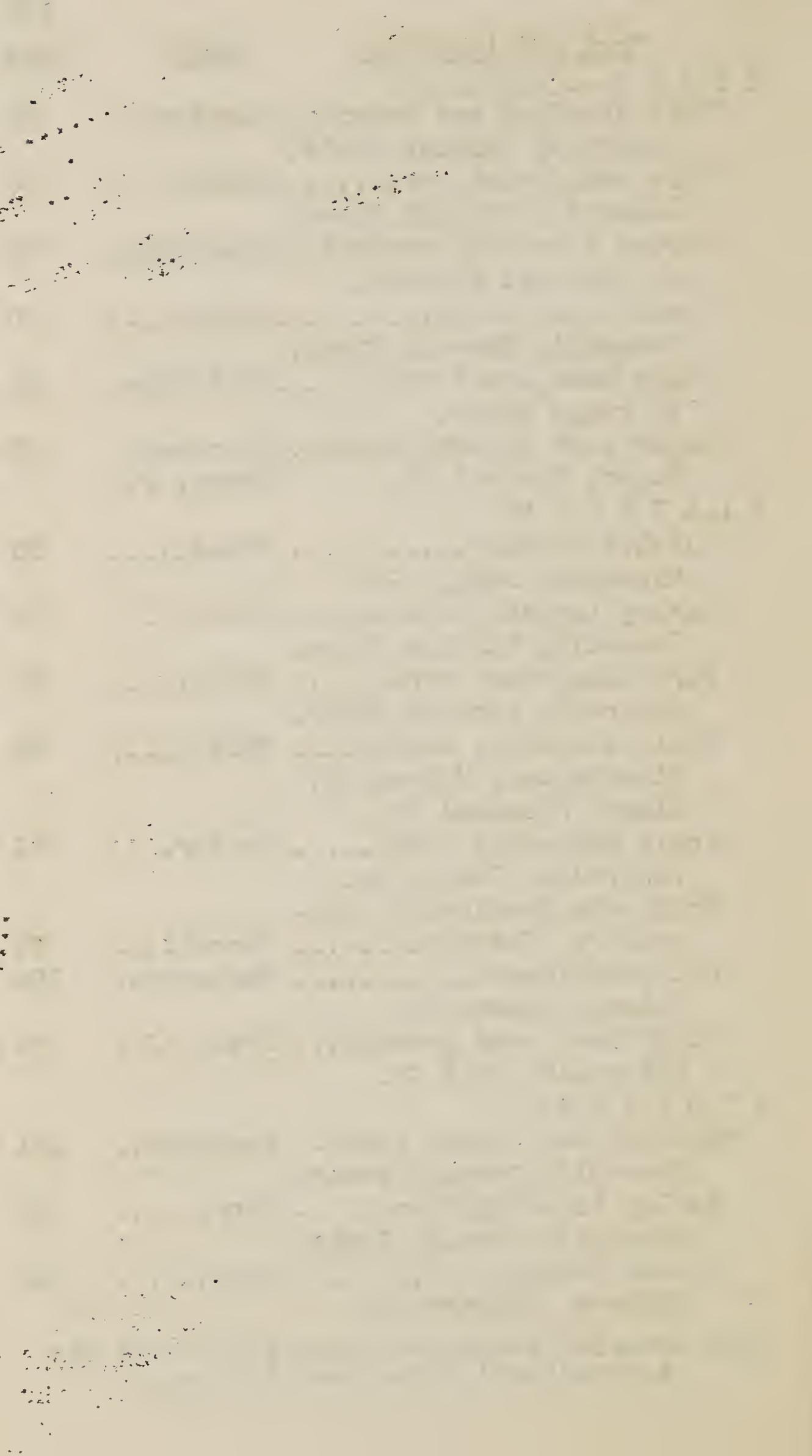
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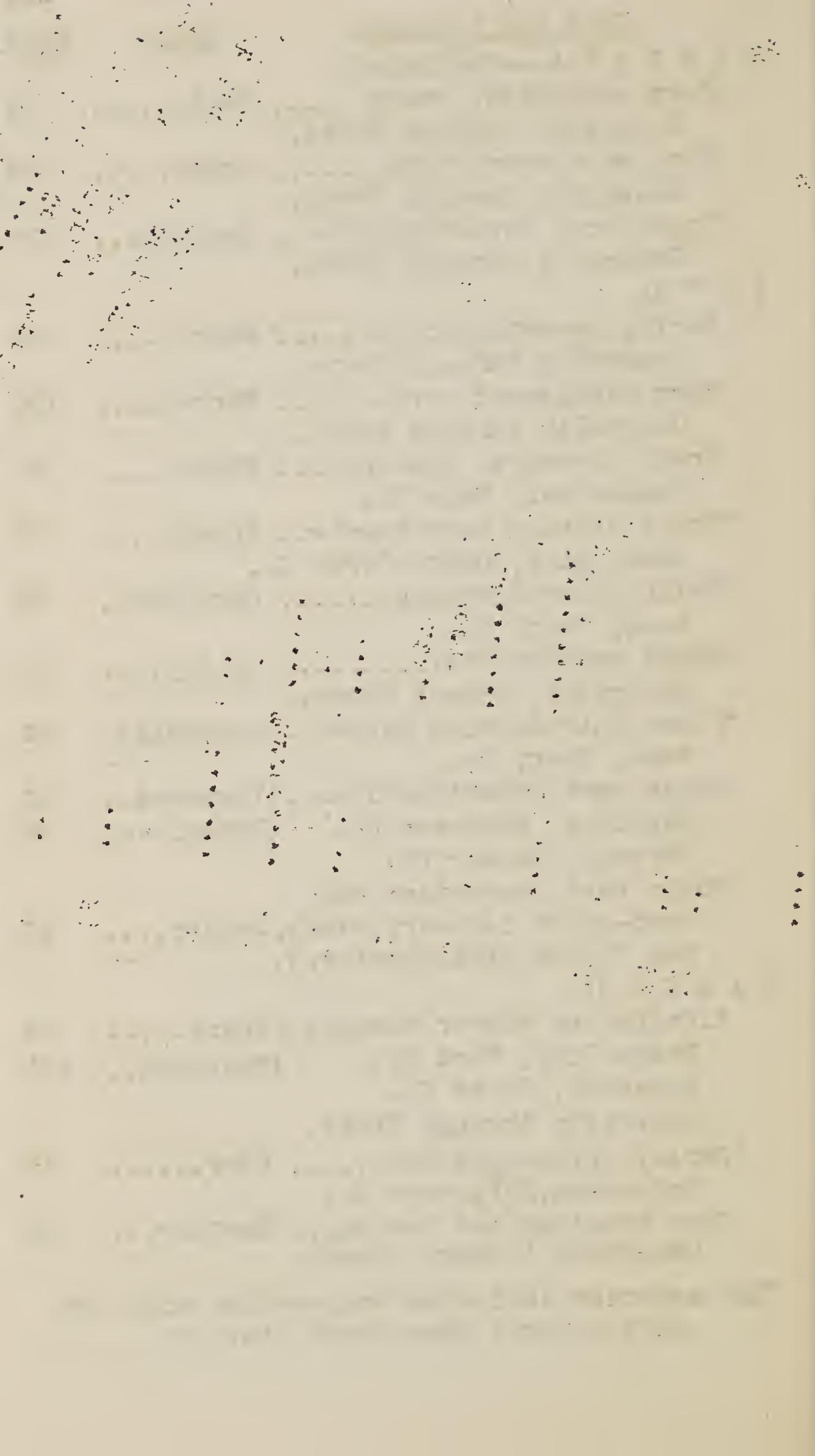
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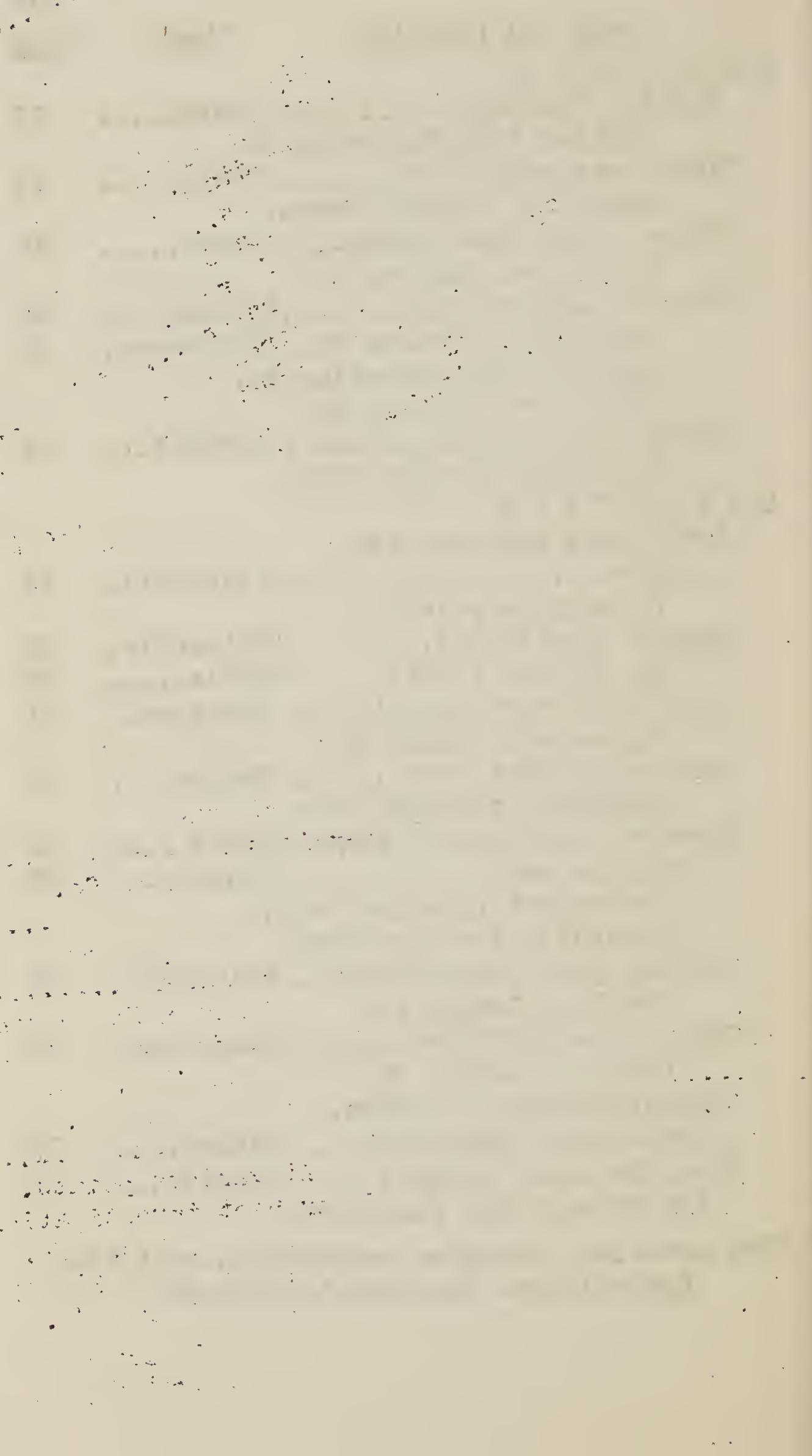
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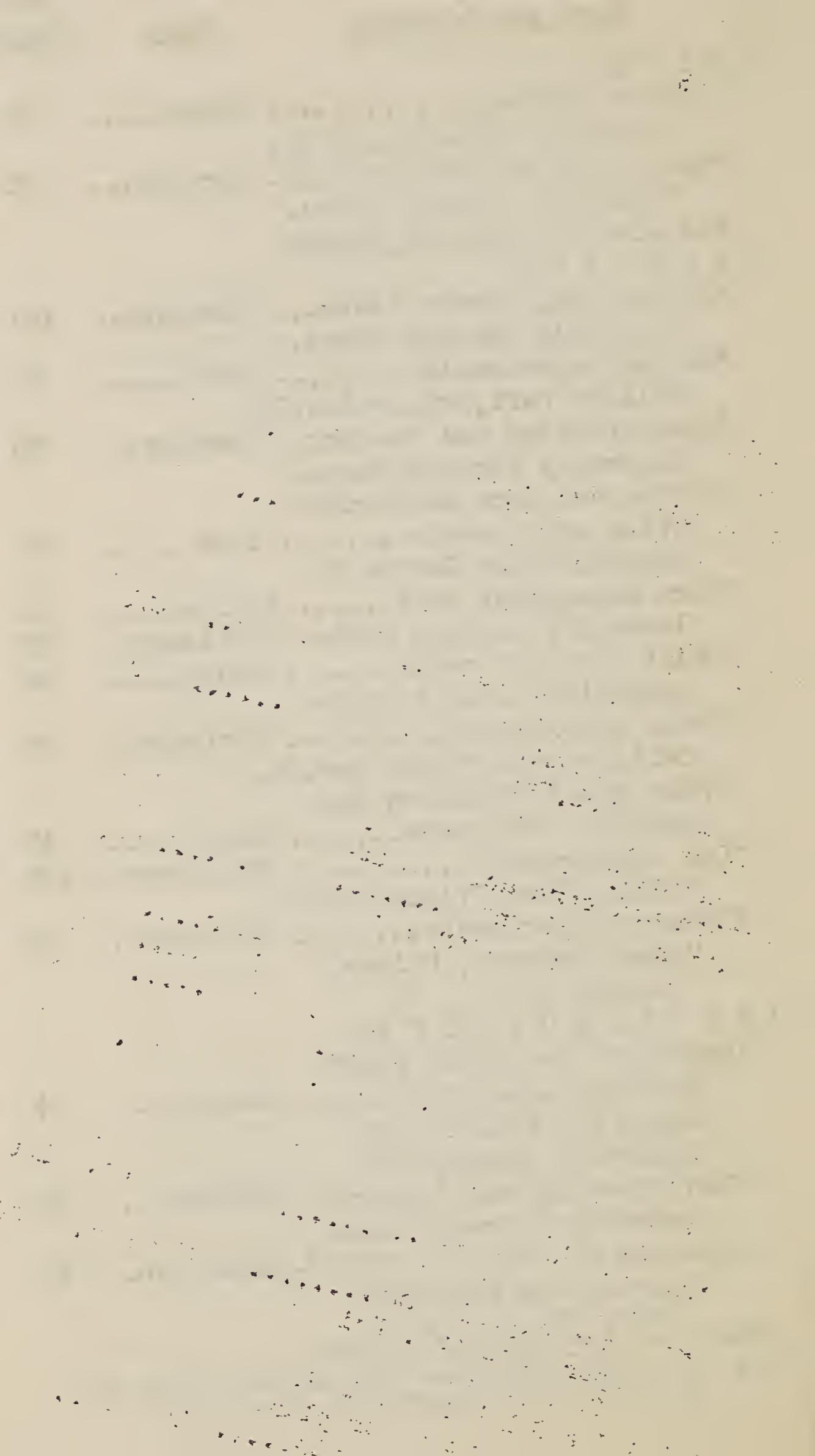


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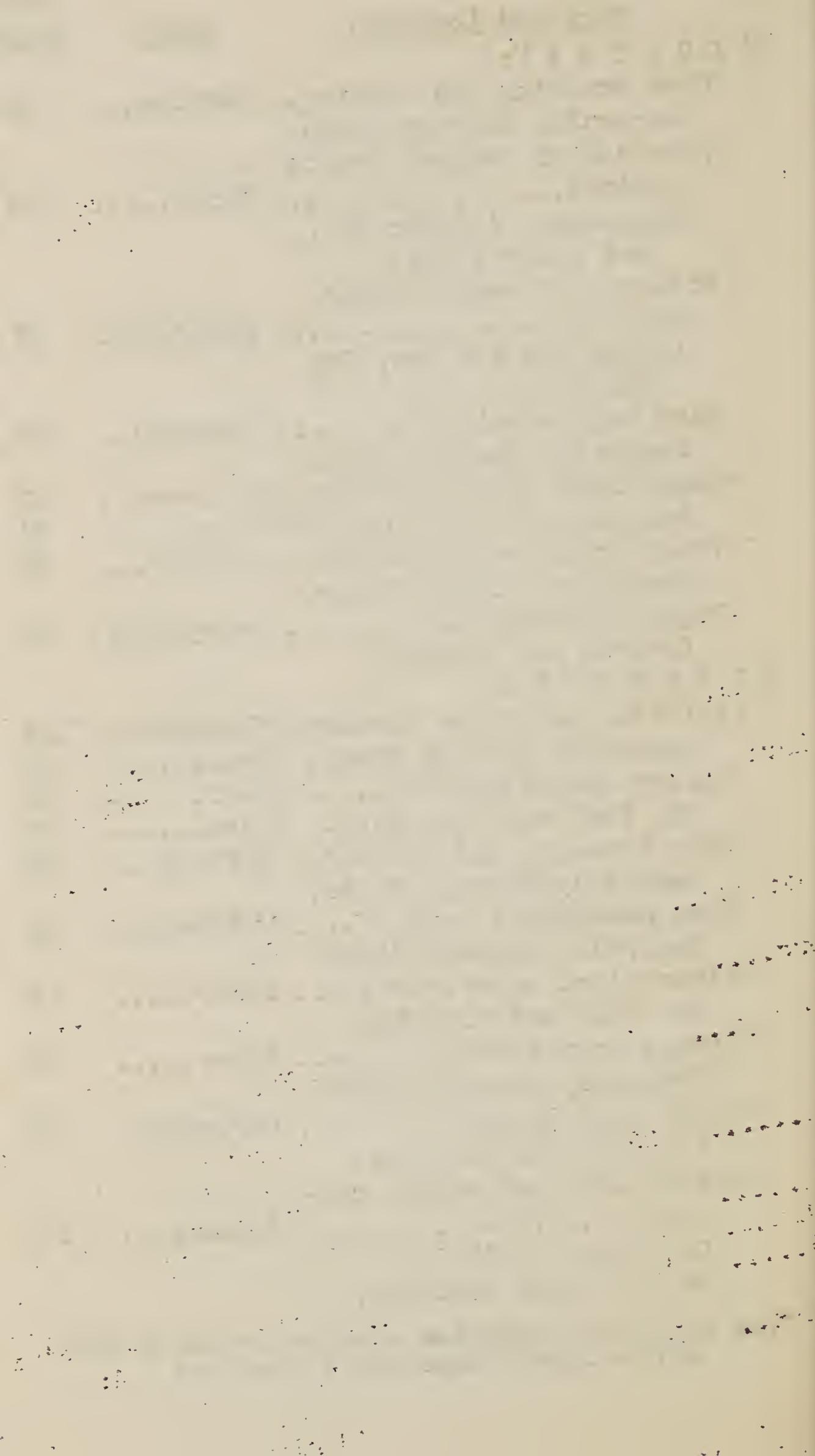
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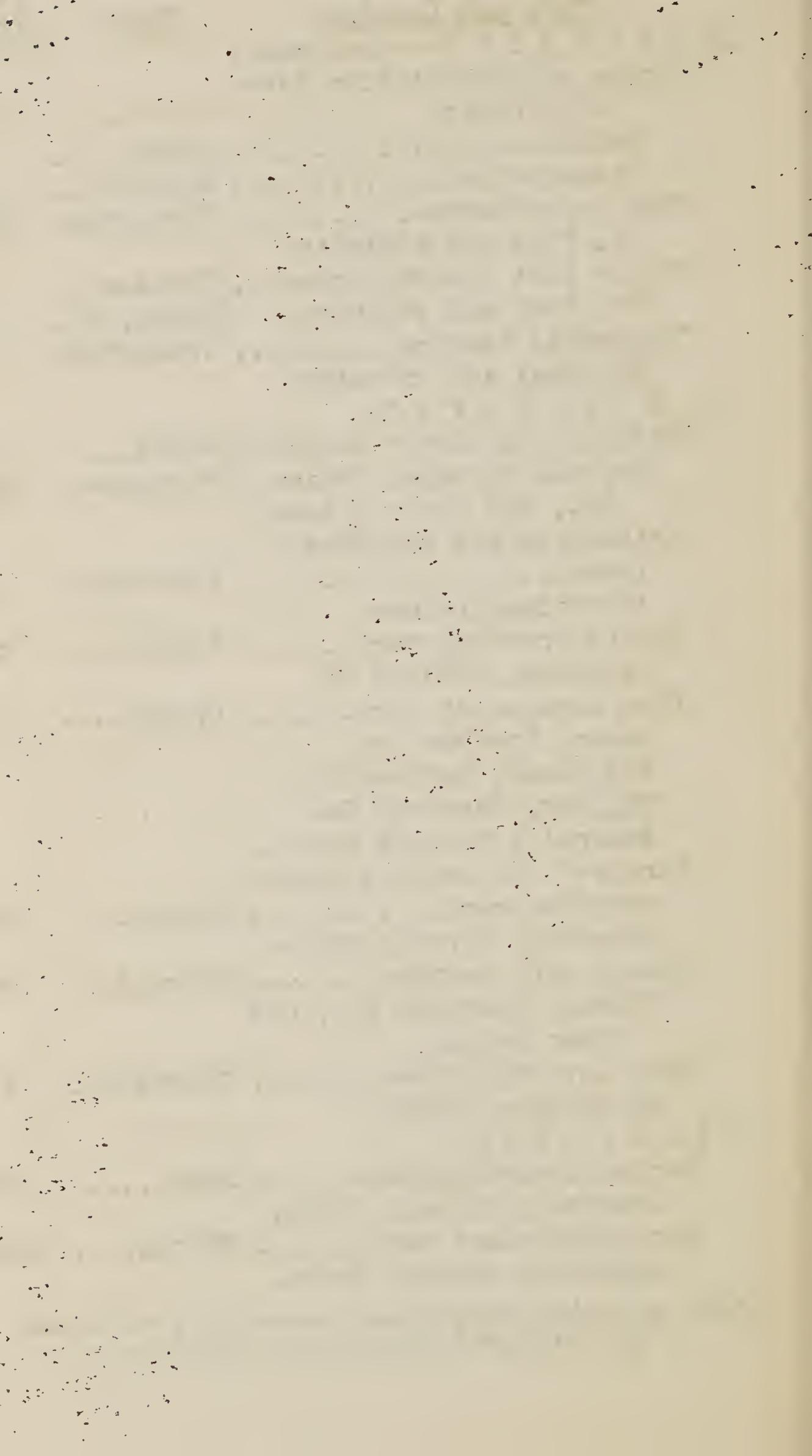
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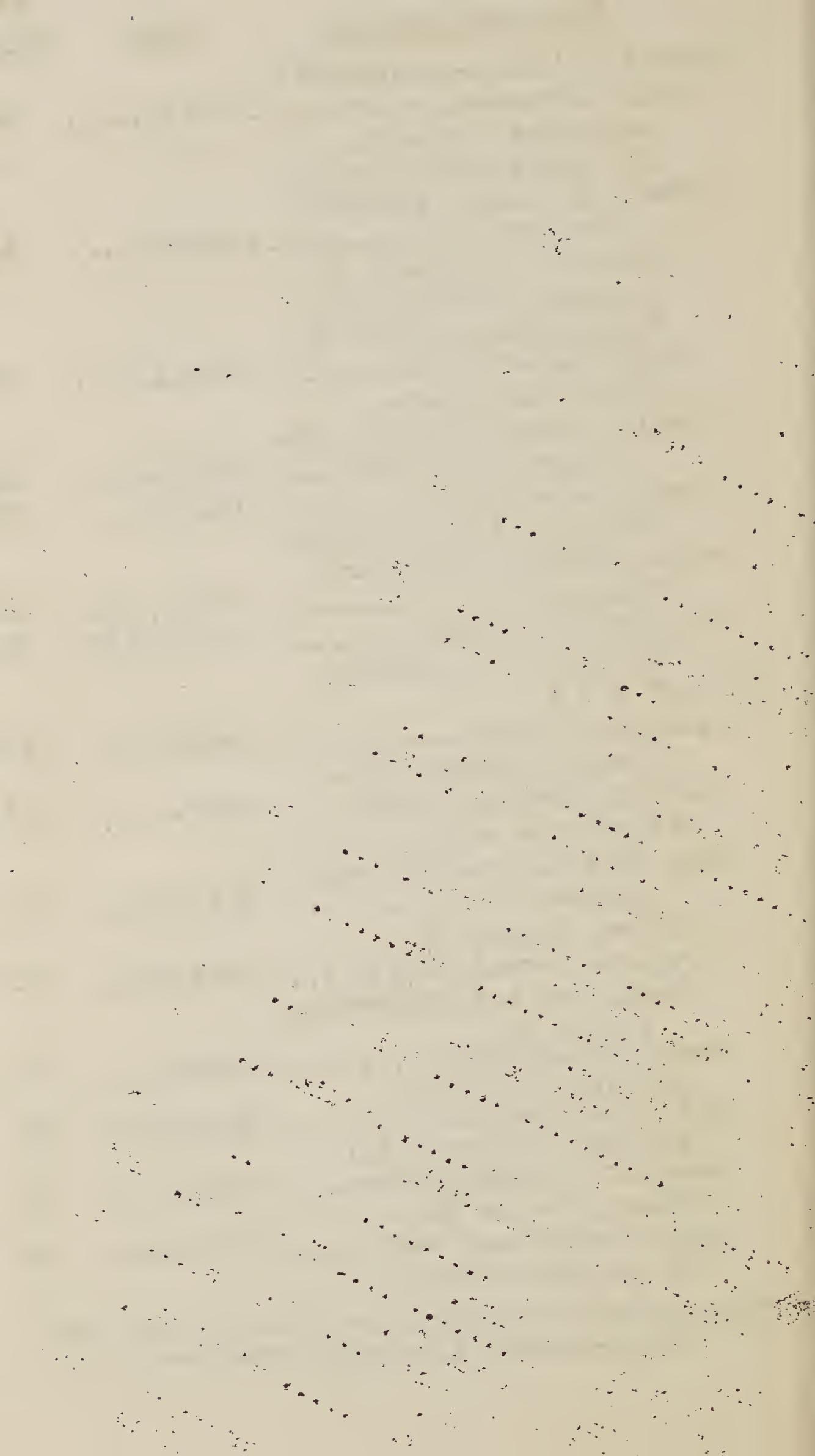
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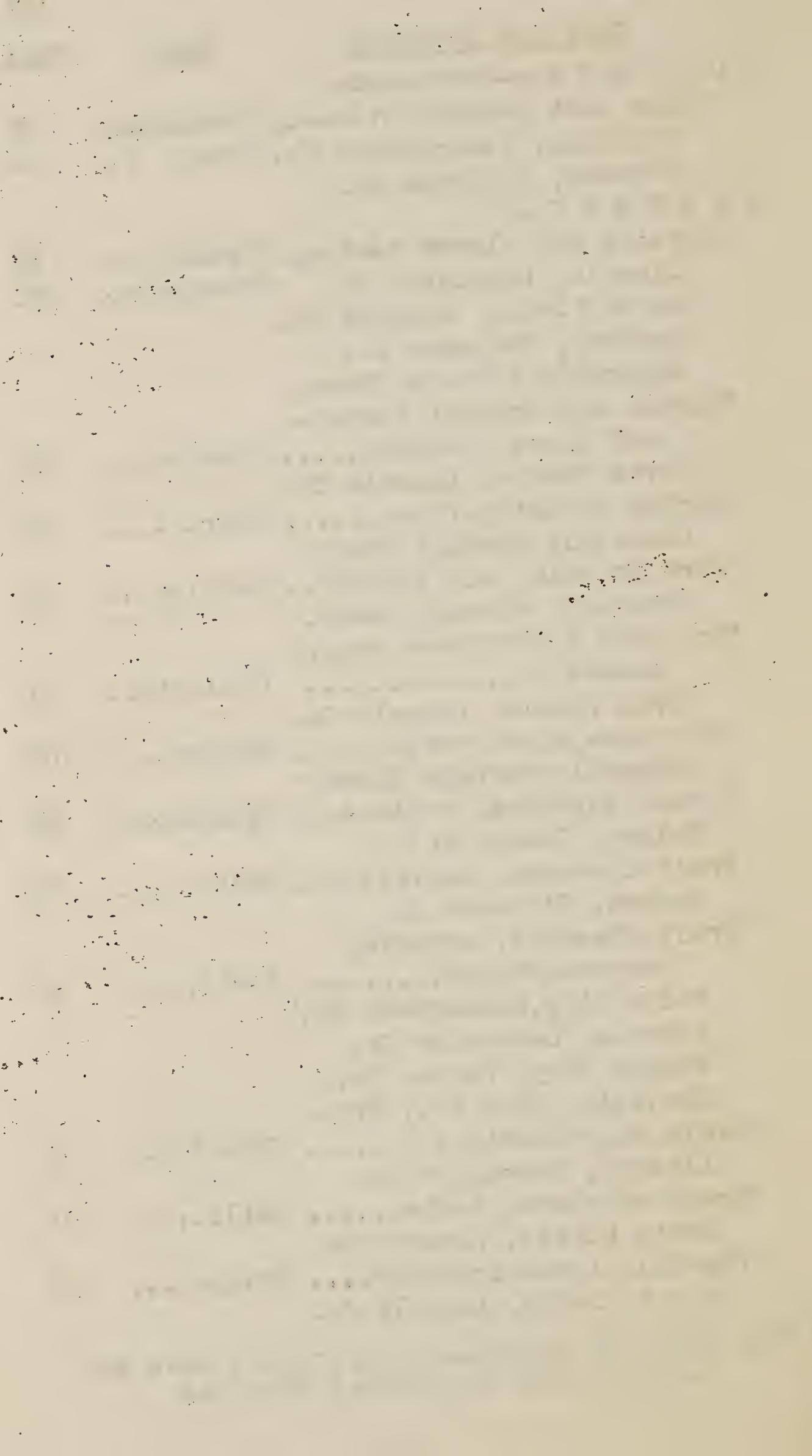


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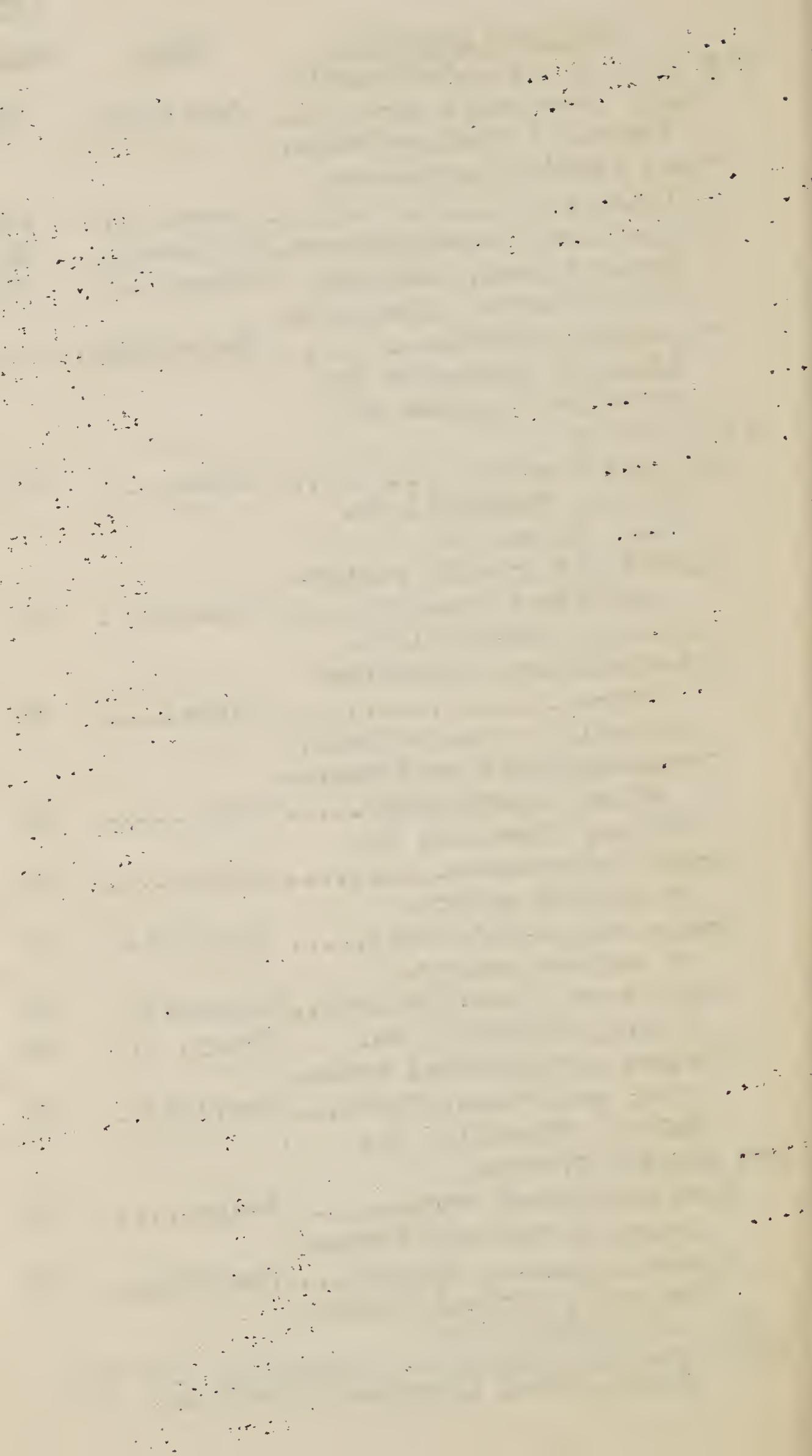


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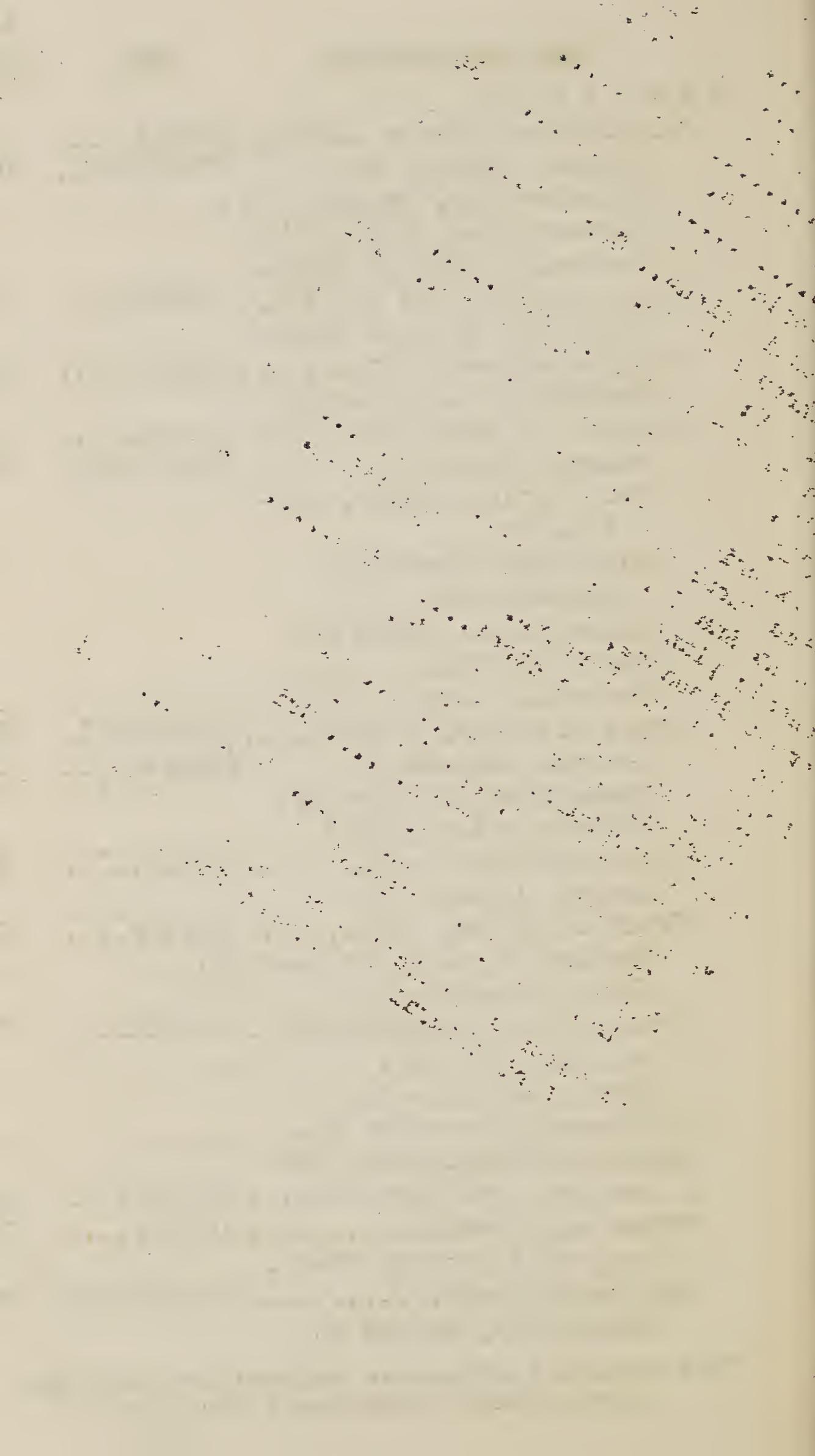
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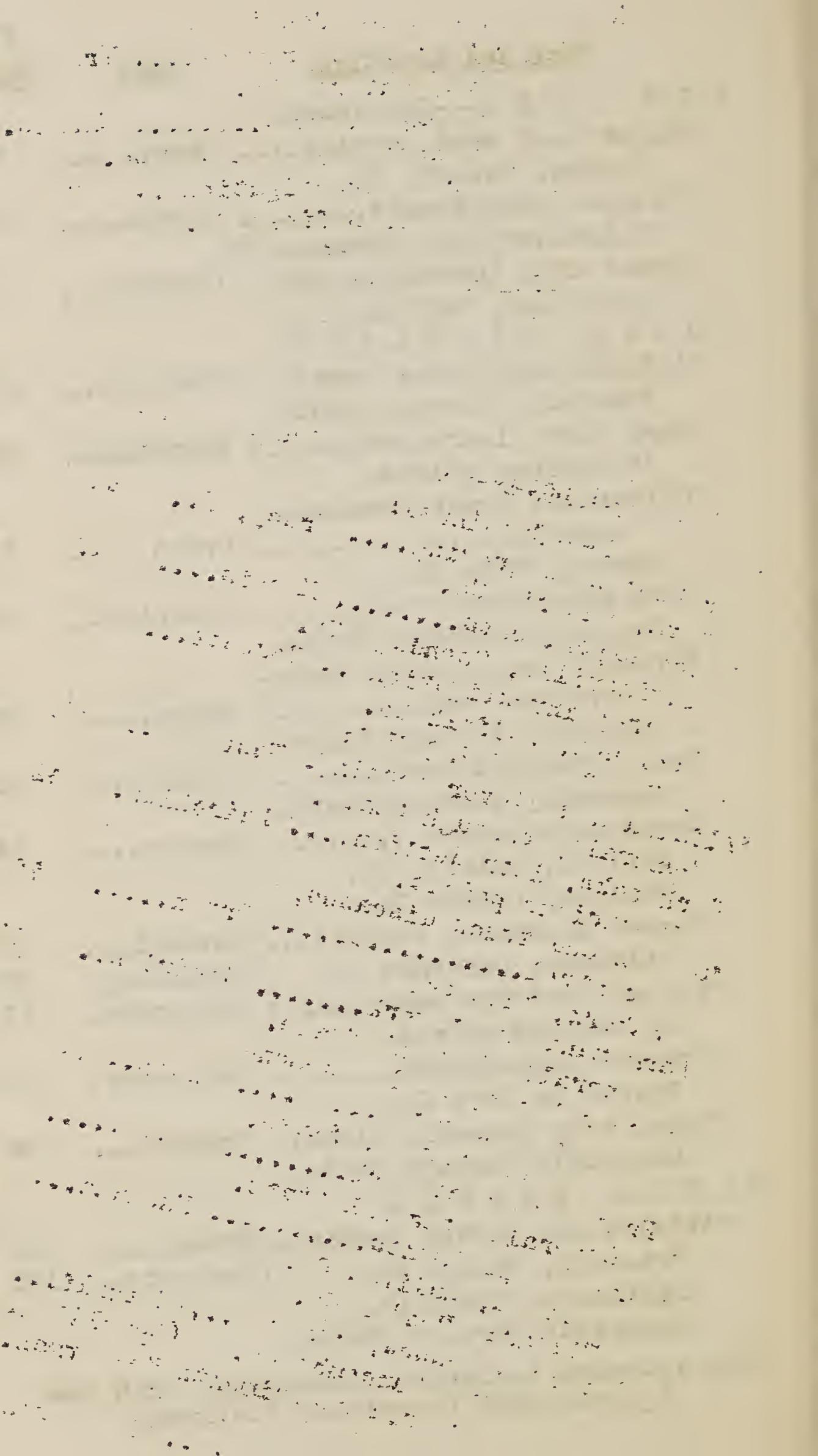
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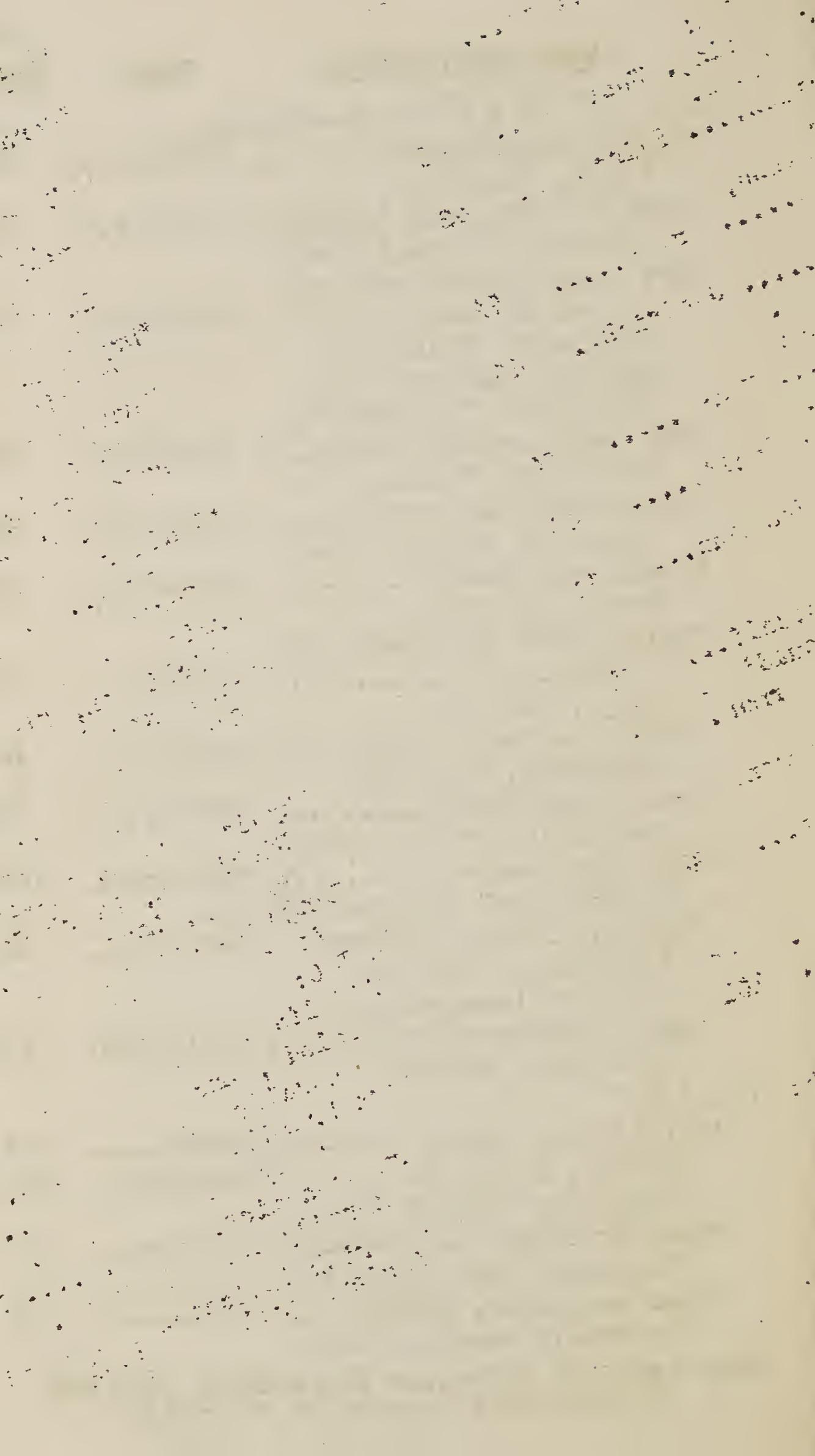
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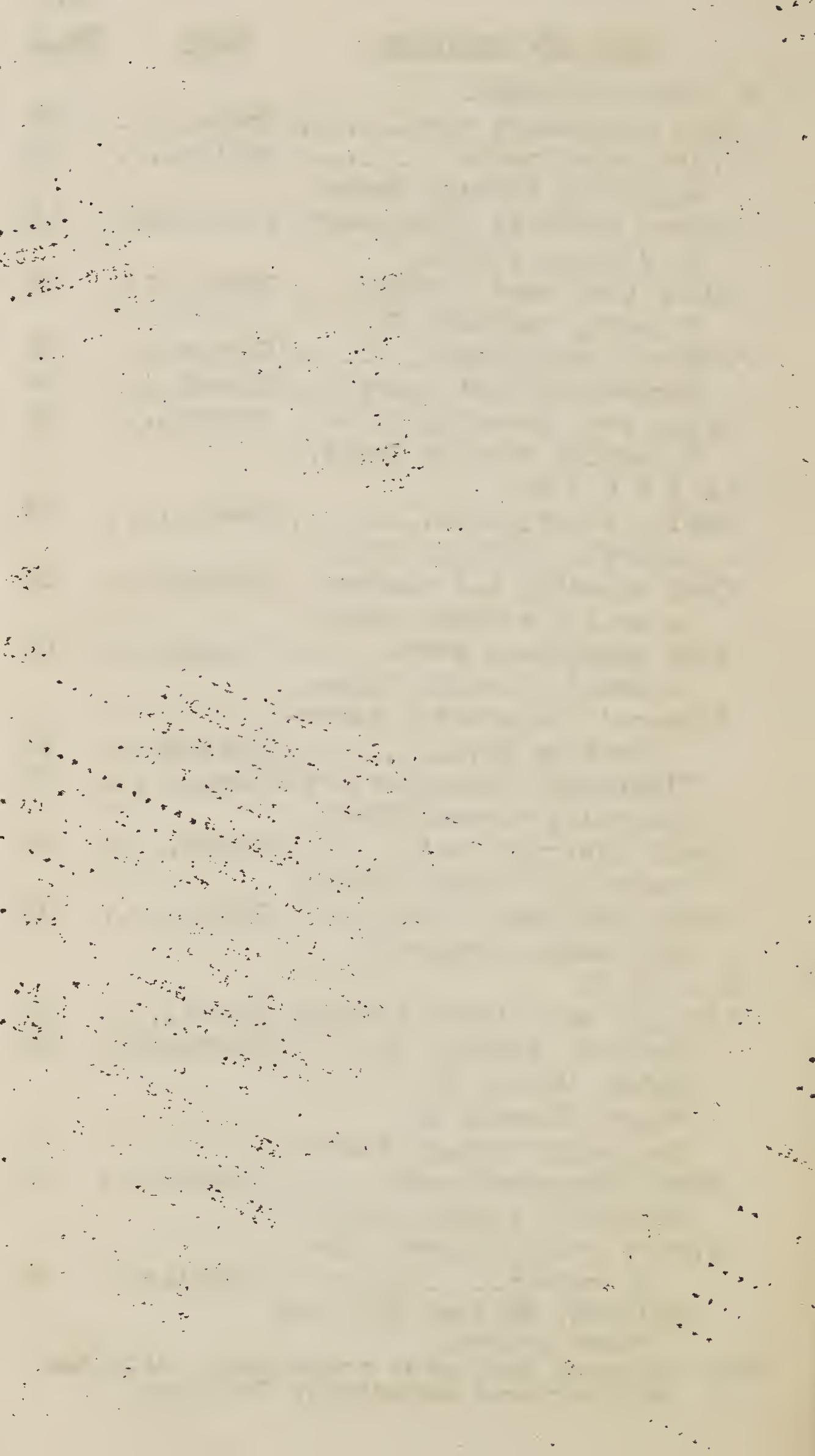


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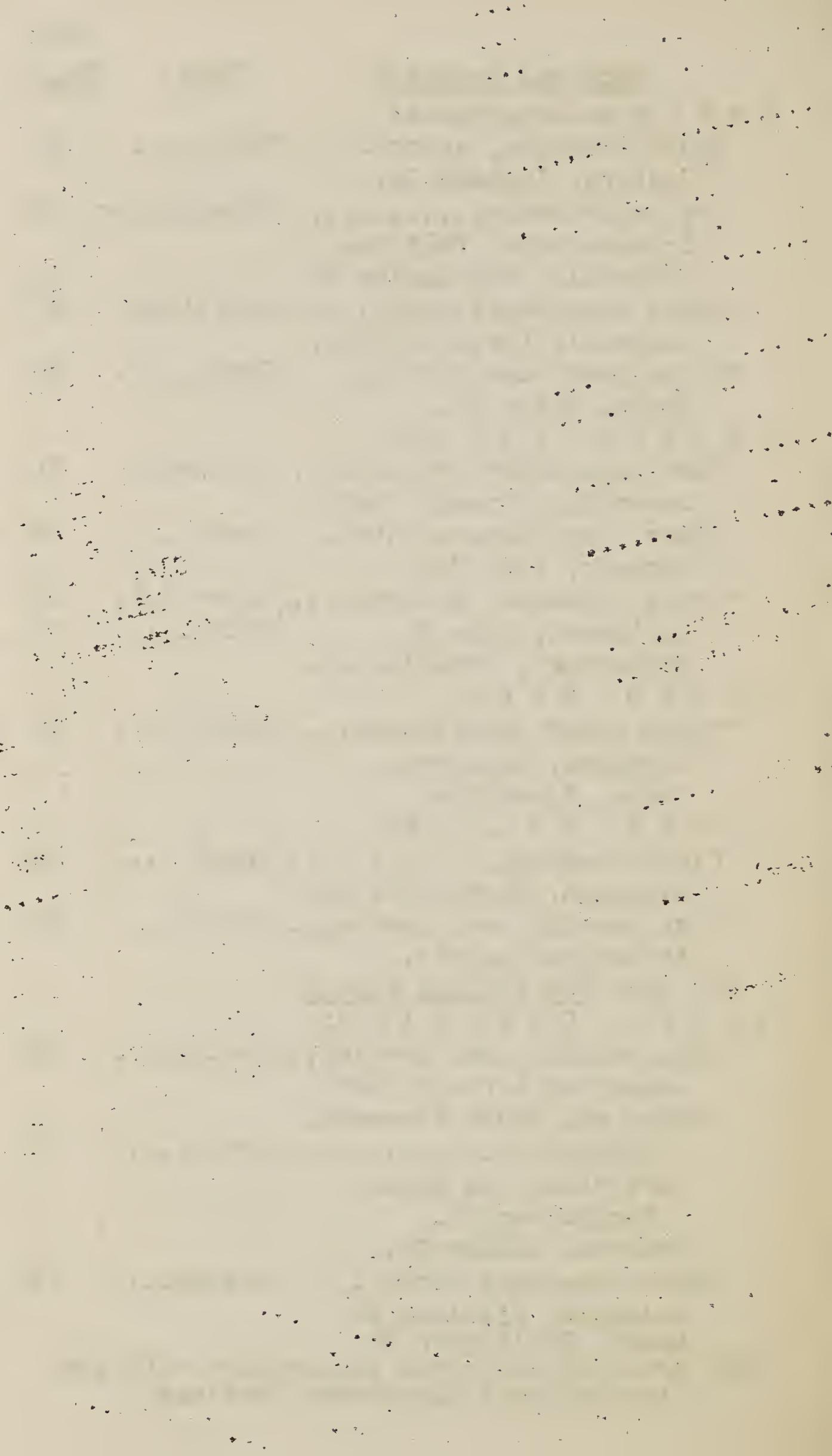
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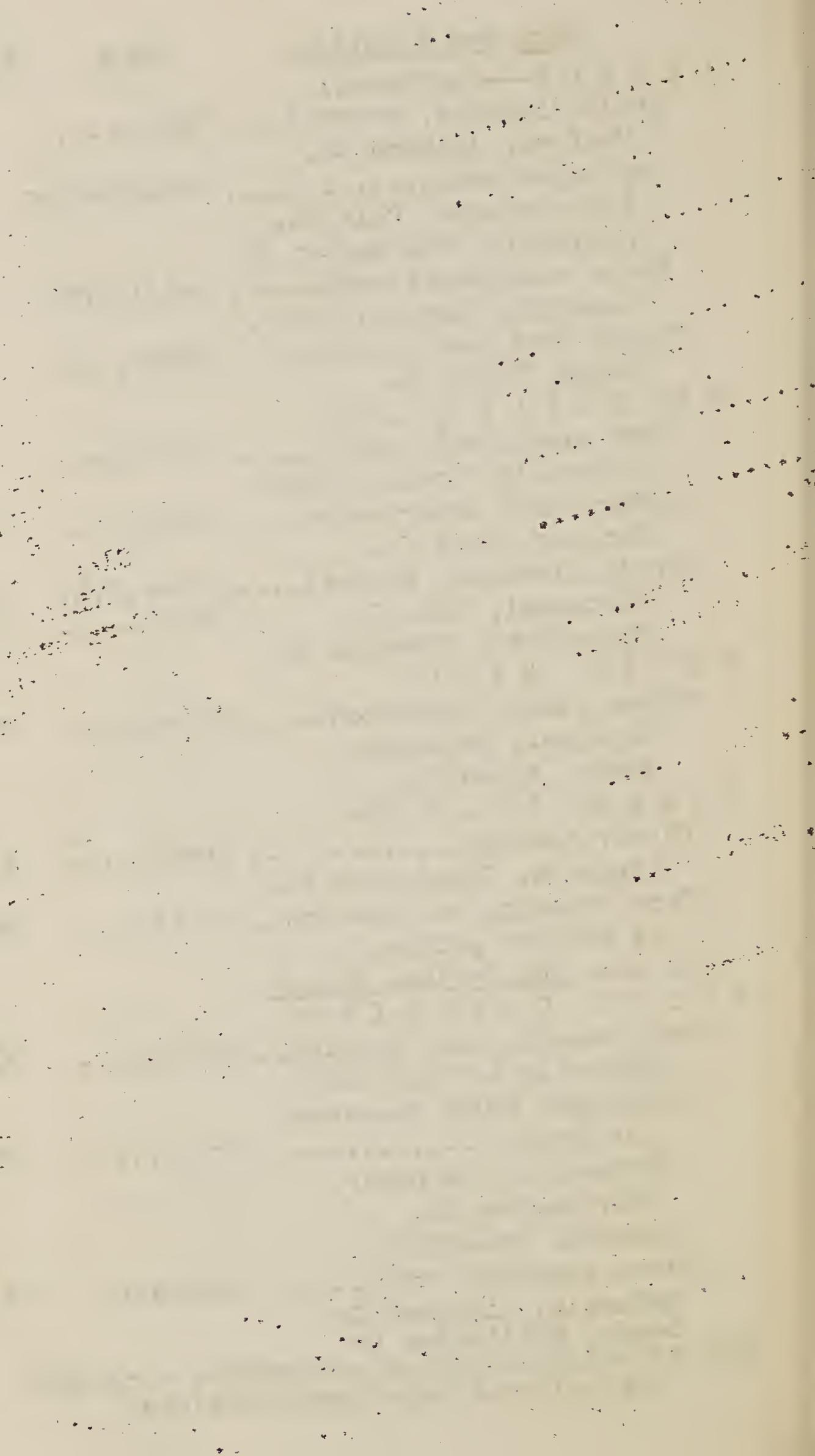


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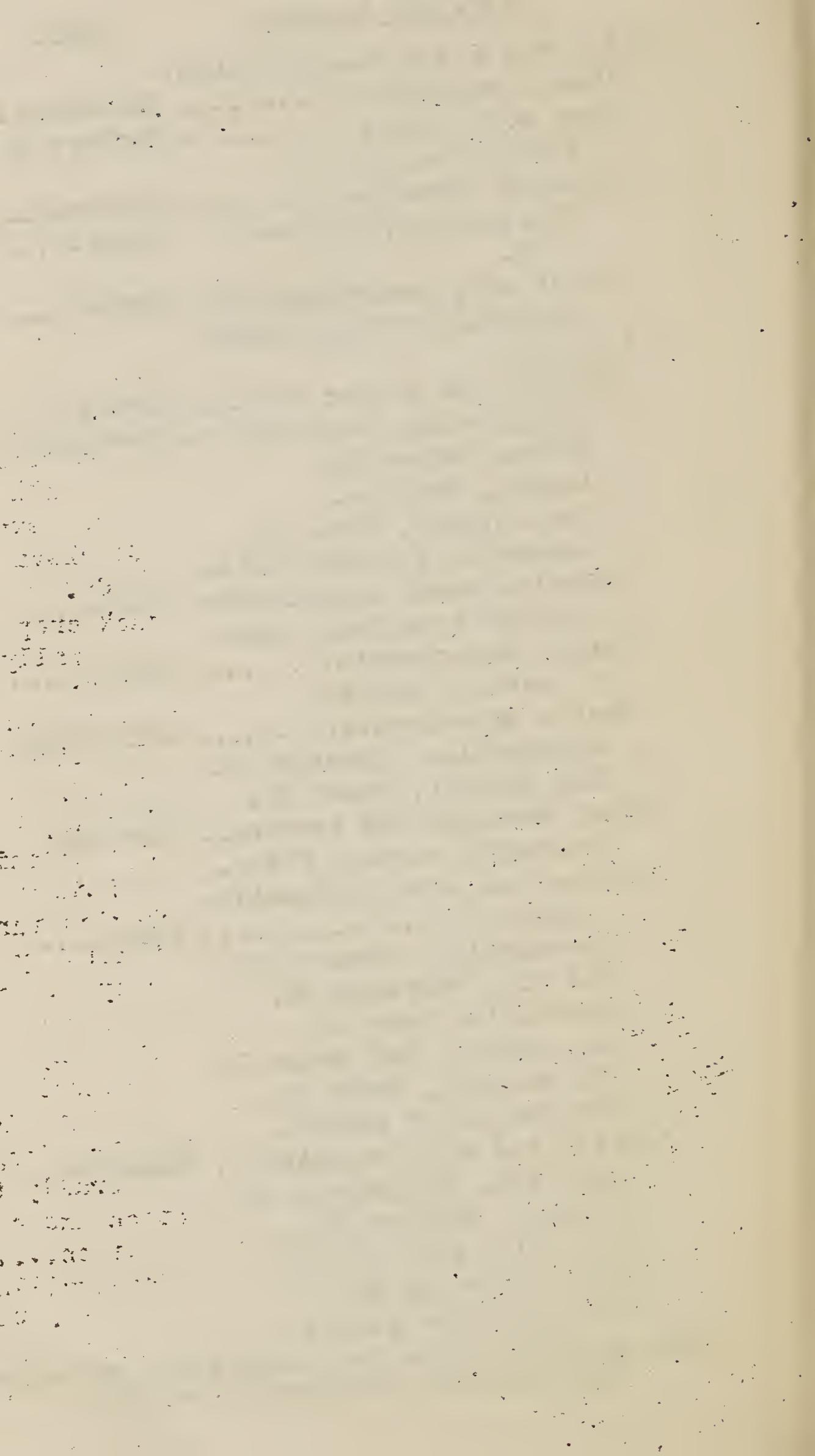
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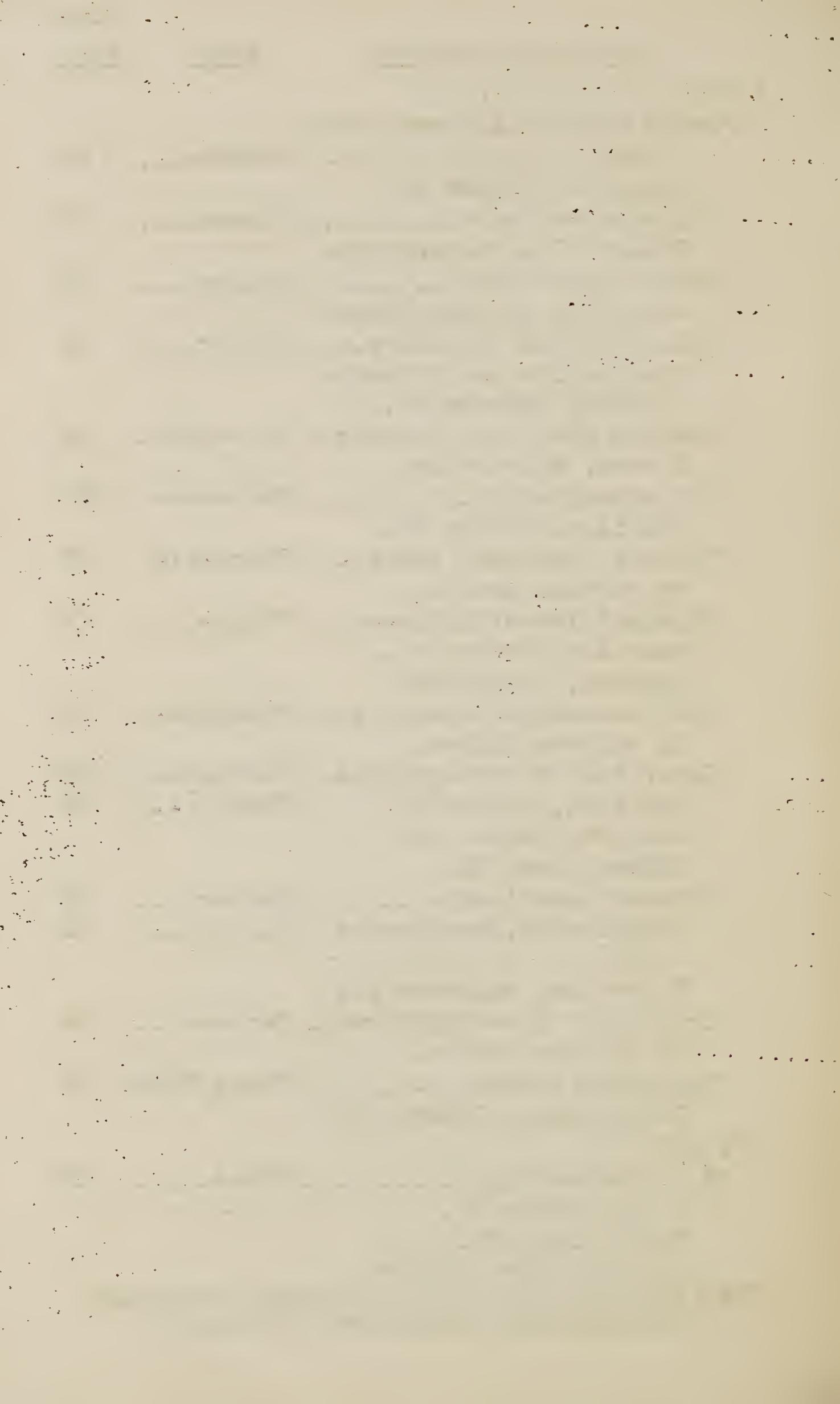
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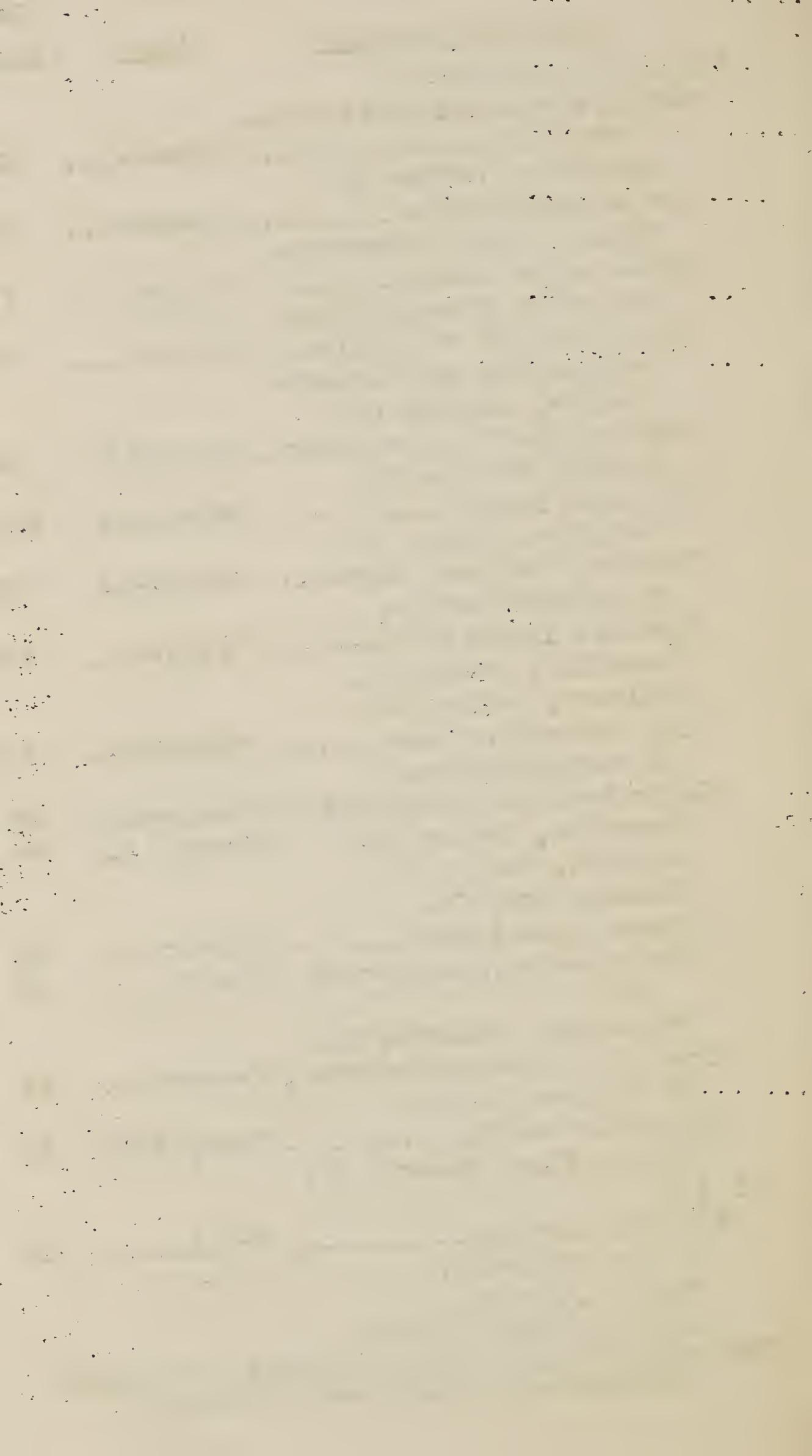
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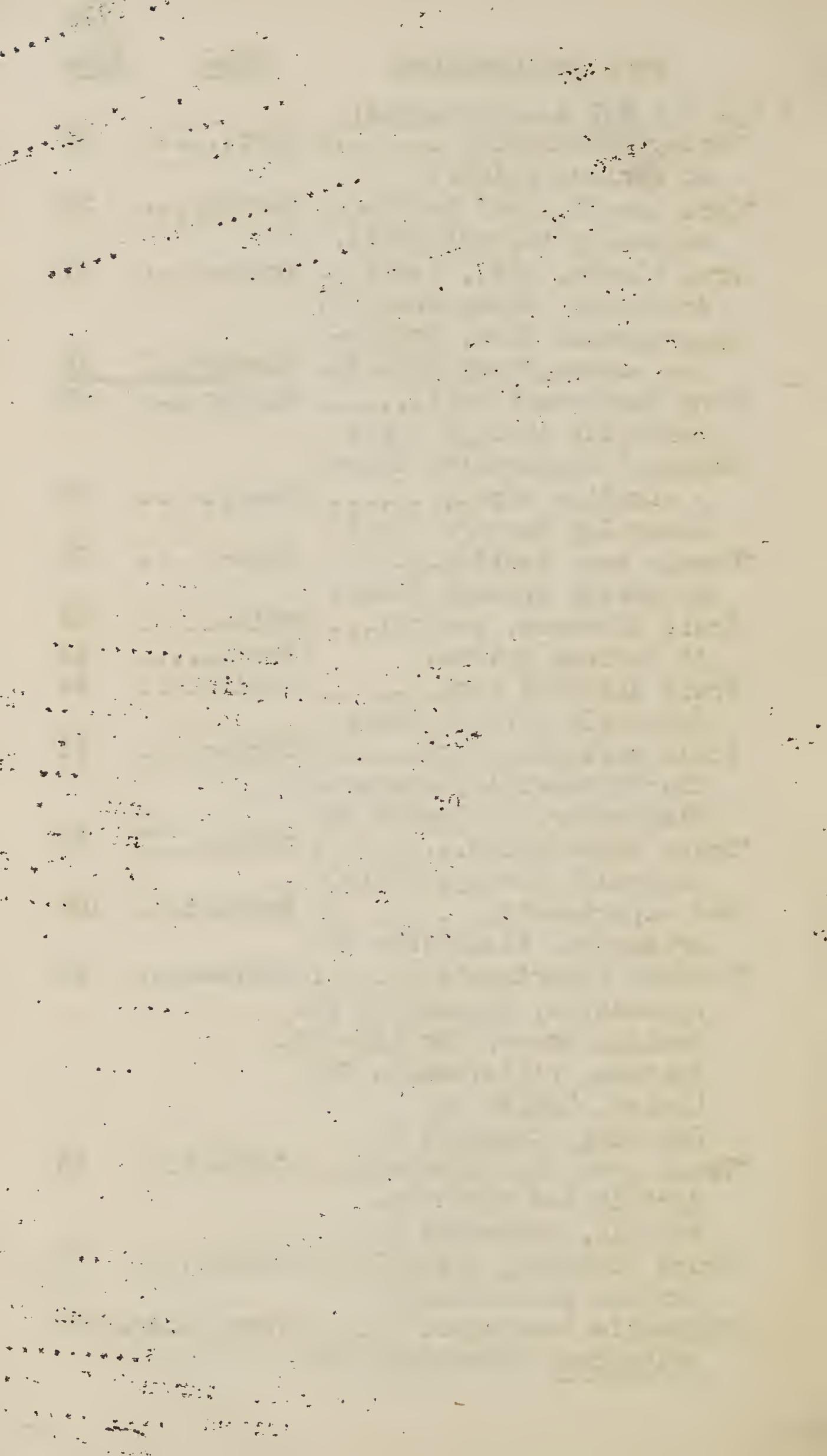
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